The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXVIII: No. 21. *New York, Thursday, November 24, 1881.* *$4·50 a Year, Including Postage. Single Copies, Ten Cents.*

Semi-Portable Compound Engine.—Paris Electrical Exposition.

Semi-portable engines, of the type which we illustrate in the present issue, are practically unknown in this country. It is rare to find here a portable engine or even a semi-portable which in any way approaches the power which this one develops, 40 horse-power being considered large for this class, while the one illustrated is capable of developing 100 or even more.

The engine was built by Hermann, La Chapelle & Co., of Paris, and is employed in driving a Gramme dynamo-electric machine at the Paris Electrical Exposition. It is compound, having two cylinders, and is capable of developing in its regular work, while controlled by the governor, from 40 to 100 horse-power. The engine, though setting on the top of the boiler, is mounted on an independent bed-plate, and may, in case of necessity, be removed and mounted as a stationary engine. The bed-plate is not bolted to the boiler directly, but to a set of steel hoops or bands, not shown in the engravings, but which surround the boiler shell. The bed-plate, see Figs. 1 and 3, at the cylinder end is enlarged to form the intermediate receiver between the two cylinders, the steam passages, the jacket, and also the front cover of the large cylinder. The low-pressure cylinder is 17⅓ inches in diameter, and the high-pressure about 10¼, making the ratio of the areas about 3 to 1. The stroke is 17¾ inches, nearly. The forked connecting rods, and several other details, are of a character rarely seen in this country on first-class work. The piston-rod stuffing boxes are somewhat peculiar, steel tubes being used for them, and the glands fitted into these tubes. This construction is rendered necessary by the fact that there are three joints to be made tight between the piston and the open air, and the insertion of the steel tube or bush makes these all secure with little trouble. These tubes are depended upon to hold the smaller cylinder central in the recess cast to receive the head. This construction is plainly shown in Fig. 1 on the high-pressure cylinder. The boiler is of a pattern not uncommon abroad, and is intended to fill the requirements of the inspection laws of the Netherlands and some other countries. They make it imperative that the interior of all boilers, large and small, shall be open to inspection. This boiler is fired at the smoke-box end, and is provided with a large flue. The return circulation is accomplished by means of small tubes. The arrangement of the flues is illustrated in Fig. 3 (see page 3). It will be noted at the left hand end (Fig. 1) there is a double flange going all the way around the boiler. These two flanges connect the head with the shell of the boiler, and are held together by bolts spaced about 2 inches apart. These are not shown in the drawing. By simply breaking this joint the front head flue, fire-box and all the tubes and the back connection may be withdrawn for inspection or cleaning. When this is done the whole interior can be easily reached. This feature is one which may well be considered by the builders of small boilers and engines in this country. It will be noted that this boilor is only 4 feet 3 inches in diameter, yet every part of the interior can be reached without any difficulty and only a small amount of labor. Under each nut on the bolts holding the head in place, rubber washers are placed so as to allow for expansion and contraction.

The engine is controlled by an Andrade governor. This has a somewhat peculiar form of connection between the ball and the vertical stems. This is shown in the elevation, Fig. 1, and also in Fig. 3. The arms are hinged together independently, and are connected with the vertical stems by a sort of "Jacob's ladder," or "lazy tongs" arrangement which gives them great power. The upper joint of this link-work is fixed to the axis, while the lower point works in a slot. The governor is said to be sensitive, and to keep the speed perfectly under control, yet from the results which are said to have been attained, we should judge it would not compare very well with the Porter governor.

This engine has a valve motion for which many advantages are claimed, and it is said to produce a horse-power for 2.64 pounds of coal per hour. For an engine of this class this is a very good record. It is intended to work with or without condensation, according to the location in which it is placed. The weight of the machine complete as shown is about 13 tons, which includes the feed-water heater shown on the elevation in dotted lines Fig 1, and upon the plan in same detail. The pump is driven by a pin on one of the fly-wheels, Fig. 3. The boiler has 417½ square feet of heating surface.

There are some details which appear peculiar, as, for example, the stop-cock Fig. 1, with its long handle, used for a throttle valve in the main steam pipe, as well as the general absence of globe valves. Taken as a whole, the engine may be regarded as a very interesting and instructive curiosity, and while few engineers would wish to construct a copy of it, there are many points about it which are very suggestive.

To get a gear wheel off a shaft upon which it has been shrunk, it is recommended to pour some melted iron around the hub, by which operation the latter will expand so quickly that there will be no time for the shaft to get hot, and the gear will come off easily.

SCIENTIFIC AND TECHNICAL.

The rapid destruction of plugs used in closing combustion tubes, frequently necessitating their replacement by new ones, has always been a source of difficulty and annoyance to chemists. Mr. I. Fleming White, when working in the laboratory of organic chemistry of Harvard University, conceived the idea of using

ASBESTUS STOPPERS FOR COMBUSTION TUBES,

the method of preparing them being as follows: The asbestus is separated into fine threads, moistened with water, twisted into a plug, crowded into the cylinder of an ordinary steel crusher, such as is used to pulverize minerals for analysis, and compressed by driving the piston of the crusher down upon it with a hammer, or better, by the screw of a vise. The plug is kept under pressure for several hours, then dried within the cylinder upon a sand bath, pushed out of the cylinder, and after ignition over a blast-lamp is ready for use. In this condition the plug loses no weight under prolonged ignition, is elastic enough to make a tight joint when fitted to a combustion tube of suitable size, and may be smoothly perforated with an ordinary cork borer. Besides simplifying the method of organic analysis by permitting the substitution of short metallic tubes for the long glass combustion tubes in ordinary use, asbestus stoppers are very useful for closing bottles which contain substances corrosive to stoppers of rubber or cork.

W. N. Hartley has been engaged for some time past in studying

THE ABSORPTION OF SOLAR RAYS BY ATMOSPHERIC OZONE,

showing in the course of his investigations that columns of air only 3 feet in length, cantaining only 1-2000th of their volume of ozone, cause a most energetic absorption of the invisible rays, and he has further found that very small quantities of the gas give an azure-blue tint to very considerable volumes of air. He says: "Messrs. Hautefeuille and Chappuis discovered the fact that ozone possessed a blue color. On filling a glass tube 2 feet in length for the purpose of some of the preceding experiments, I was surprised to find how small a proportion of ozone is visible to the eye. In a column of the atmosphere 1 square cm. in sectional area, which would weigh 1033.33 grams, the maximum amount of ozone would be at least 0.00258 gram, supposing the gaseous constituents of the atmosphere to form a homogeneous mixture. This calculation is based on the determination of the amount of ozone in the air made by M. Houzeau. The proportion by weight at the maximum was 1-450,000th, or by volume 1-700,000th. In a 2-foot tube a full pure sky-blue tint is seen when 0.002542 gram of ozone is contained in each square centimeter of sectional area. This number approximates very closely to the above; hence it may be assumed that if these determinations be correct, the blue tint of the atmosphere must certainly be due to some extent to ozone, at times if not always. Now, if we consider that 2.5 mg. of ozone in each square centimeter of sectional area of a column of air produce a full sky-blue tint, it is impossible to believe that light, which has traversed columns of air under ordinary conditions of temperature and pressure, and 27 to 35 miles in length, has not made its way through 2.5 mg. of ozone. The length of an atmospheric column at the ordinary temperature and pressure would be 5¼ miles, and while we are in doubt as to the constitution of the higher atmosphere, such reasoning cannot justly be applied to the blue color of the sky."

Mr. W. Carter, in a note recently communicated to "Nature," gave an account of

THE EFFECT OF PRESSURE ON SEED GERMINATION,

in which it was stated that under a pressure of two and a half atmospheres, mustard seed germinated 25 hours earlier than under the ordinary atmospheric pressure. The early development, however, became permanently arrested during the eight days of the experiment, and the cotyledons of one that had escaped entirely from the seed coat remained as etiolated as if grown in absolute darkness, while those under ordinary pressure grew rapidly, and their cotyledons acquired a deep green color. The etiolated plants, when removed from the pressure, rapidly grew into vigorous young plants. An increased pressure would, therefore, seem to stimulate germination and prevent the formation of chlorophyl. The pressure was obtained by the use of a column of mercury. The seeds were sown on moist cotton wool, placed in a small bottle, which was then secured to the curved extremity of a glass tube, into the long arm of which mercury was poured until it reached a hight of 45 inches above the level of the metal in the short arm.

Seafaring men often have occasion to observe

THE MODE OF FLIGHT OF THE ALBATROSS,

being struck with the fact that the bird gets up to windward without appearing to use his wings to a degree sufficient to account for the same. The sailors are satisfied with the explanation that he beats to windward. The conditions are, of course, not analogous to those of a ship sailing to windward. If the wind be very light, or if there be a calm, occasional powerful and obvious flapping of the wings occurs. If there is no wind, the birds often settle on the water round the ship. In very heavy weather the birds disappear altogether, probably settling on the water. Except that for breeding they resort to islands, it is believed that they frequent the open ocean, where the surface is seldom without more or less swell. On watching the flight of the albatross, one observes that, in order to rise from the water, violent and obvious flapping of the wings is necessary, which is continued some time after the wings cease to strike the water. After a start has thus been effected, if there is a fresh breeze, the wings are kept almost motionless. Sometimes the bird goes some distance with the impetus derived from the flapping of the wings at the start, but sooner or later he turns so as to expose the plane surface of his wings full to the force of the wind, rising, at the same time, some hight above the water, and drifts off to leeward, thus soon acquiring the velocity of the wind; then swooping down into the hollow between two swells, he turns his head to windward, and keeping close to the surface of the water, sails along more or less against the wind for a surprising distance; finally, rising over the crest of a wave comparatively high into the air, and turning with his wings as before, so as to catch the wind to the fullest extent, he again lets himself drift off to leeward. Thus the maneuver he performs seems to consist in drifting with the wind in such a way as to attain its velocity very soon, and then turning round so as to make use of this velocity to carry him in the contrary direction.

Mr. E. Chappuis recently made some investigations concerning

THE ACTION OF OZONE ON GERMS CONTAINED IN THE AIR,

attempting to show that ozone had the power to destroy the germs which are the cause of fermentation and other similar phenomena. For this purpose dust from the air was collected on cotton stoppers, and some of these exposed to the action of ozone. The ozonized stoppers were then brought in contact with liquid beer yeast, the necessary precautions being taken to prevent the introduction of other material. Even in 20 days no effect was produced in the clear liquid, while the unozonized stoppers caused turbidity even in a few days from the development of certain organisms. Hence ozone kills the germs in the air which can develop in beer yeast. Extended experiments may show whether there exist any relations between the sanitary condition of a place and the amount of ozone in the air, as, according to modern views, the spread of contagious diseases is caused by germs or low organisms which are transported by the air.

A promising improvement has been made in electric lighting by substituting

IRIDIUM FOR ELECTRIC LAMPS,

in place of the carbon pencils hitherto almost exclusively used as poles in exhibiting the voltaic arc. Iridium is fusible only in the arc from a very powerful battery, and by keeping the intensity of the current below a given point the metal can be maintained at a temperature of about 4000° F., which is far below its melting point, though high enough to add the light of an intense incandescence to the brilliancy of the arc itself. At this temperature the iridium points remain completely unchanged, and the variations and flickerings due to the rapid wearing away of carbon pencils are entirely absent in the new light; while the consistency with which the source of the illumination keeps its place peculiarly adapts it for use in the focus of the Fresnel lenses, or the parabolic reflectors which, in lighthouses or in similar situations, take their place. The process by which the iridium, naturally a gritty and intractable powder, is formed into pencils for use in lamps is an ingenious adaptation of a patent issued long ago for making the same metal into points for gold pens, and depends upon the property which iridium possesses of forming a compound with phosphorus, which can then be melted at a temperature of about 3000° F.—about the fusion point of iron—and molded into masses which can be subsequently dephosphorized, and regain the original infusibility of the pure metal.

The force exerted by the expansion of water when freezing is known to be considerable. Mr. Hagenbach experimented, during the past severe winter, upon the

BURSTING POWER OF ICE,

making two of his interesting experiments with cast-iron hand grenades. The outer diameter was 15 cm. (5.8 inches), the inner diameter 12.8 cm. (5.4 inches). The shells were filled with water, closed with a screwed iron plug, and exposed to the cold. Both shells were broken, and a curved thread of ice was projected from the upper surface. One of the plugs was evidently thrown out with great violence, and to such a distance that it could not be found. The curvature in that case was upward.

An Improvement in Wire Rope.—It is well known to mining engineers that the weight of the wire rope used in deep mines is so great that every means is adopted to lessen it. With that end in view, the sections nearer the hoisting cage are often made lighter, the strength of the rope being increased in proportion as it has more of its own weight to carry. A German firm, H. Kern & Co., of Gleiwitz, has commenced to manufacture wire, the gauge of which grows smaller the longer it is, and from this wire A. Deichsel, of Zabrze, is now making hoisting rope, and at the Dusseldorf Exhibition showed a length of nearly 900 feet, in which the wires composing the strands were of one piece, though the weight per unit varied.

At the beginning of the present year there were in operation in this country 170,103 miles of telegraph lines, over which, during 1880, no fewer than 33,155,091 messages were sent. The length of telegraph lines in the principal countries in which they are used, is tabulated thus:

	Miles.
United States	170,103
Russia	56,170
Germany	40,431
France	36,900
Austria-Hungary	30,403
Australia	26,842
Great Britain	23,156
British India	18,209
Turkey	17,085
Italy	15,864

It is stated by Mr. Gautert, in a paper recently read before the Verein Deutscher Ingenieure, that the annual production of the fifteen dynamite manufactories now under Nobel's control is between 4500 and 5000 tons. In 1867 it was only 11 tons; in 1870, 424, and in 1874, 3120 tons. According to a rough estimate, the make of dynamite and other explosives containing nitroglycerine, in Europe and America, is placed between 7000 and 8000 tons, equal to at least from 40,000 to 50,000 tons of ordinary powder.

As an example of light steam engines we may mention a pair of compound engines made by Messrs. Ahrberker & Son, London, which develop 30 horse-power and weigh only 168 pounds all told. The boiler weighs 142 pounds. These engines are intended for use in aerial propulsion, and are, of course, extremely simple in detail.

It is reported that a bridge will be built across the Ohio River at Henderson, by the Louisville and Nashville Railroad Company. It will consist of two spans of 160 feet each; one span of 500 feet, and a draw of 71 feet, which will be located on the Indiana side. The span will be 100 feet above low water.

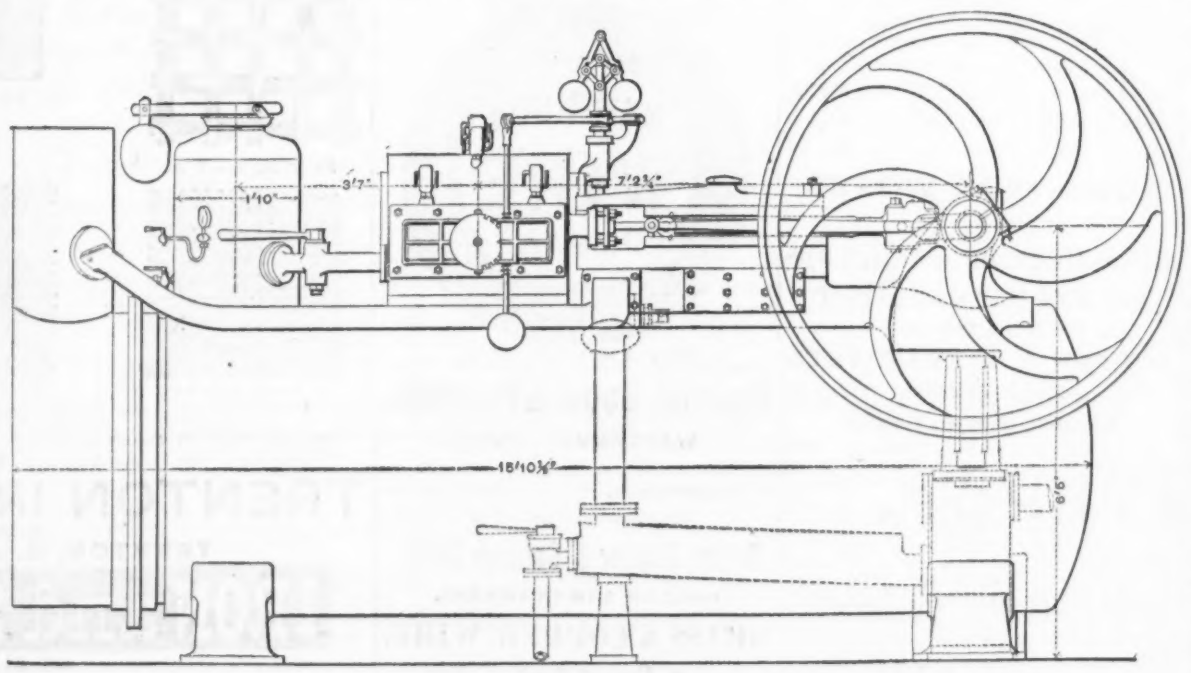


Fig. 1.—Side Elevation.

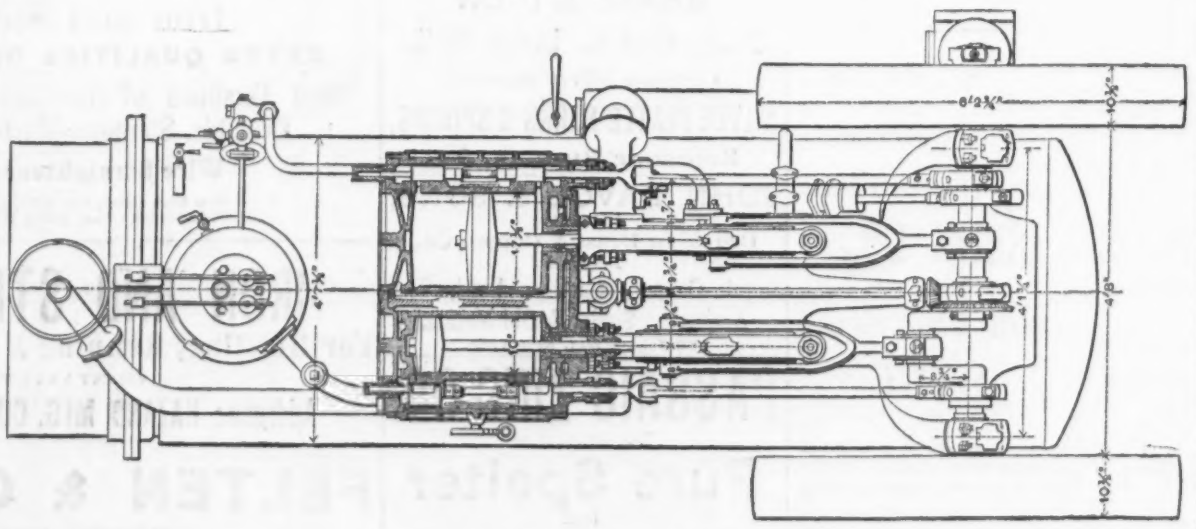


Fig. 2.—Plan and Section through Cylinders.

A FRENCH SEMI-PORTABLE COMPOUND ENGINE.

Metals.

ANSONIA
BRASS & COPPER CO.,
No. 19 Cliff Street,
Phelps Building, NEW YORK.
MANUFACTURERS OF
BRASS AND COPPER
IN
Sheets, Bolts, Rods, Wire, &c.
Seamless Brass & Copper Tubing.
Ansonia Corrugated Stove Platforms.
PURE COPPER WIRE
For Electrical Purposes, Bare and Covered.
Phosphor Bronze Rods for Pumps, &c.
ANSONIA ★ REFINED
INGOT COPPER.

PHELPS, DODGE & CO.
IMPORTERS OF
TIN PLATE,
ROOFING PLATE,
Sheet Iron, Copper, Pig Tin, Wire,
Zinc, &c.
MANUFACTURERS OF
COPPER AND BRASS.
CLIFF STREET, NEW YORK.

SCOVILL MFG CO
BRASS,
HINGES, WIRE, GERMAN SILVER.
PHOTOGRAPHIC GOODS.
BUTTONS,
CLOTH AND METAL.
DEPOTS,
419 & 421 Broome St., N. Y.
177 Devonshire St., Boston.
183 Lake St., Chicago.
FACTORIES,
Waterbury, Conn.
New Haven, Conn.
New York City.

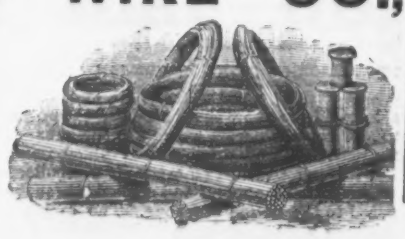
DICKERSON, VAN DUSEN & CO.,
Importers of
Tin Plate, Pig Tin, Sheet Iron, Cooper,
Wire, Zinc, Etc.
29 & 31 Cliff St., cor. Fulton,
DICKERSON & CO., Liverpool. NEW YORK.

A. C. NORTHROP,
Waterbury, Conn.,
NOVELTIES IN BRASS AND OTHER METAL GOODS
FOR HARDWARE TRADE.
Wrought Iron and Brass Machine Screws; Turned, Hexagon, Round and Square Head Cap and Set Screws; Brass and Iron Safety and Jack Chain; Gilt, Nickel Plated and Bronze Trimmings of all kinds, from Sheet Iron, Steel or Brass.
Estimates on patented articles, or any description of Sheet Metal work, respectfully solicited and promptly given.

WORKS AT TRENTON, N. J.
ROEBLING'S
WIRE ROPE
New York Office AND Warehouse
117 Liberty Street.
THE JOHN A. ROEBLING'S SONS CO.,
MANUFACTURERS OF
WIRE ROPE
OF
Iron, Steel and Copper
FOR
Hoisting Purposes of all kinds, for Ferries, Stays, Ship Rigging, Sash Cords, Lightning Rods, &c., &c.
Suspension Bridge Cables.
GALVANIZED
Telegraph Wire,
Market Wire,
Vineyard Wire.
Iron and Steel
WIRE
FOR
Market Wire, Fence Wire Bridge Wire, Chain Wire Buckle Wire, Spring Wire, Rivet Wire, &c., &c.
GALVANIZED WIRE CLOTHES LINES.

BRODERICK & BASCOM,
MANUFACTURERS OF
IRON WIRE ROPE. STEEL WIRE ROPE.


728 N. Main St., St. Louis, Mo.

WORCESTER WIRE CO.,
Manufacturers of
IRON AND STEEL
WIRE
For all Purposes.
WORCESTER, MASS


Metals.

Waterbury Brass Co.
CAPITAL, - - $400,000.
Sheet, Roll and Platers' Brass,
GERMAN SILVER,
Copper, Brass and German Silver Wire,
BRASS AND COPPER TUBING,
COPPER RIVETS & BURS,
BRASS KETTLES,
Door Rail, Brass Tags,
PERCUSSION CAPS,
POWDER FLASKS.
Metallic Eyelets, Shot Pouches, Tape Measures, &c.
And small Brass Wares of every Description.
Cartridge Metal in Sheets or Shells a Specialty.
Sole Agents for the
Capewell Mfg. Co.'s Line of Sporting Goods and Wood's Paper Shot Shells.
DEPOTS:
296 Broadway, New York,
189 Eddy St., Providence, R. I.
Mills At
WATERBURY, Conn.

Detroit Copper & Brass Rolling Mills.
BRAZIERS' AND SHEATHING COPPER,
ROLLED, SHEET & PLATERS' BRASS
GERMAN OR NICKEL SILVER,
Copper Wire for Electrical and other purposes,
Brass and German Silver Wire,
Copper Rivets and Burrs,
COPPER BOTTOMS FOR TEA KETTLES AND BOILERS,
Cor. Larned & Fourth Sts., Detroit, Mich.

ROME IRON WORKS,
Manufacturers of
Brass, Gilding Metal, Copper and German Silver
(In Sheets, Rods, Tubing or Wire),
COPPER & BRASS RIVETS AND BURS.
Rome, New York.

Metals.

The Plume & Atwood Mfg. Company,
MANUFACTURERS OF
SHEET and ROLL BRASS and WIRE,
German Silver and Gilding Metal
Copper Rivets and Burs,
Kerosene Burners,
Lamp Trimmings, &c.
18 Murray Street, New York.
13 Federal Street, Boston.
109 Lake Street, Chicago.
Rolling Mill, THOMASTON, Ct.
Factories, WATERBURY, Ct.

Bridgeport Brass Co.,
MANUFACTURERS OF
Sheet and Roll Brass,
Brass & Copper Wire & Tubing,
German Silver Metal and Wire,
Copper and Iron Rivets.
OILERS and CUSPADORES, | LAMPS and TRIMMINGS,
LANTERNS and TRIMMINGS, | KEROSENE BURNERS,
Clocks & Fly Fan Movements | PLUMBERS' MATERIALS.
Particular attention paid to cutting out Blanks and manufacturing Metal Goods.
MANUFACTORY, *Bridgeport, Conn.* | WAREHOUSE, *19 Murray St., N. Y.*
THOS. W. FITCH, Prest. and Treas. A. A. LASAR, Secy

STANDARD WIRE
HARRISON
WIRE
COMPANY.
TRADE MARK
ST. LOUIS, MO.

Holmes, Booth & Haydens,
WATERBURY, CONN.
NEW YORK, 49 Chambers St. | BOSTON, 18 Federal St.
Manufacturers of all kinds of
Brass, Copper & German Silver,
ROLLED AND IN SHEETS.
BRASS & COPPER WIRE,
Tubing, Copper Rivets & Burs.
BRASS & IRON
JACK CHAIN, DOOR RAIL.
German Silver Spoons,
SILVER PLATED FORKS & SPOONS,
Kerosene Burners, &c.

JOHN DAVOL & SONS,
Agents for
Brooklyn Brass & Copper Co.,
Dealers in
Ingot Copper, Spelter, Lead, Tin, Antimony, Solder & Old Metals.
100 John Street, New York.

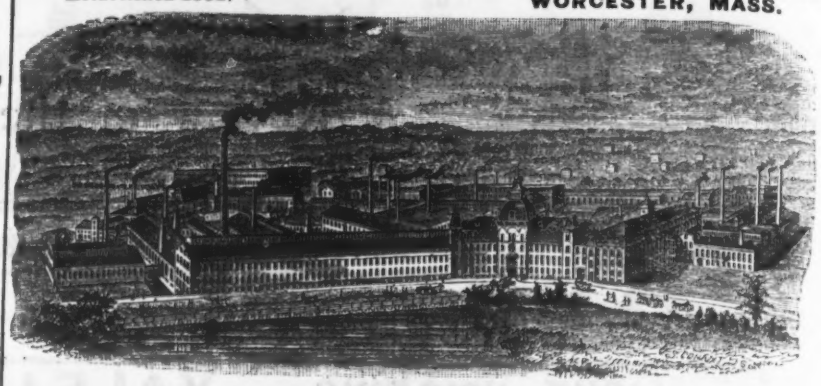
PASSAIC ZINC CO.
Manufacturers of
Pure Spelter
FOR
Cartridge Brass, Gas Fixtures, Bronzes
AND ALL FINE WORK.
Also for
Galvanizers & Brass Founders.
MANNING & SQUIER, Gen'l Agents,
113 Liberty Street, N. Y.

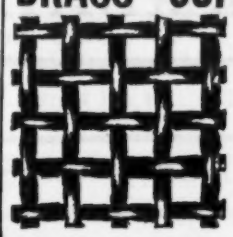
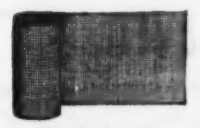
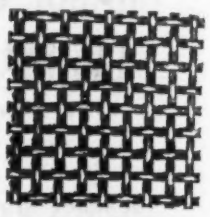
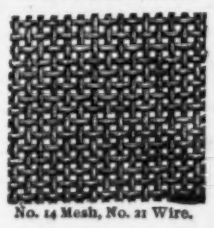
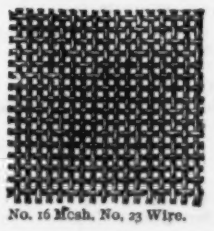
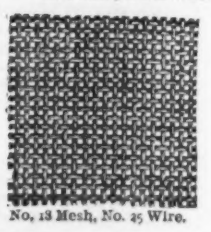
Geo. W. Prentiss & Co.,
HOLYOKE, MASS.,
MANUFACTURERS OF
IRON WIRE.

Bright, Coppered, Annealed and Tin Plated. Also GUN SCREW WIRE
Of all sizes straightened and cut to order.

The Schoenberg Metal Mfg. Co.,
Manufacturers of and Dealers in
SOLDER, TYPE,
Stereotype, Electrotype and Babbitt Metals,
Importers of Block Tin, Antimony, &c. Refiners of Lead, Spelter, &c. Highest price paid for Old Metals and all kinds of Dross. 528 and 530 East 20th Street, between Avenues A & B, New York.

Wire, etc.

PHILIP L. MOEN, President and Treasurer. CHAS. F. WASHBURN, Vice President & Secretary.
WASHBURN & MOEN MANUFACTURING CO.
Established 1831. WORCESTER, MASS.

MANUFACTURERS OF
IRON and STEEL WIRE,
Patent Steel Barb Fencing, Patent Steel Wire Bale Ties.
WIRE RODS of all Grades; Round Iron, Rivet quality, 3-16 in. to ¼ in., cut to any length. Owners and exclusive Operators of the **PATENT CONTINUOUS ROLLING MILL,** producing Iron and Steel WIRE, in coils of 100 pounds, without SEAM or WELD. **Patent Galvanized Telegraph Wire,** Market and Stone Wire, Annealed Fence and Grape Wire in long lengths; Coppered Pail-Bail Wire; Rope, Bridge, Bolt, Screw, Rivet, Buckle and Chain Wire. Wire for the manufacture of Card Clothing, Heddles, Reeds, &c. Piano-string Covering Wire, Tinned Broom Wire and Tinned-plated Wire of all sizes. A specialty is made of Clock, Machinery, Gun Screw and Spiral Spring Wire, and Refined Wire to Pattern for particular purposes, from selected stamps of Norway Iron. Any grade of Wire furnished, Annealed, Bright, Polished, Coppered, Galvanized or Tin Plated. Wire furnished, Straightened and Cut to any length. **Steel Crinoline Wire,** Patent Linen finish. **Unrivaled Steel Music Wire.** Steel Wire for Springs, Needles and Drills. Market Steel Wire kept in stock, all sizes.
WAREHOUSE, 21 Cliff Street, New York. **St. Louis Warehouse, 802 North 2d St. Chicago Warehouse, 107 Lake St.**

HOWARD & MORSE,
Warehouse, 45 Fulton Street, New York,
MANUFACTURERS OF
BRASS COPPER AND IRON WIRE CLOTH.

No. 4 Mesh, No. 14 Wire.

Wire Cloth, partly unrolled.

No. 8 Mesh, No. 18 Wire.

No. 14 Mesh, No. 21 Wire.

No. 16 Mesh, No. 23 Wire.

No. 18 Mesh, No. 25 Wire.

ABRAM S. HEWITT, President. WM. HEWITT, Vice President. JAMES HALL, Treasurer. E. HANSON, Secretary.
THE TRENTON IRON COMPANY,
(INCORPORATED 1847),
TRENTON, N. J., Manufacturers of
IRON and STEEL WIRE
OF ALL GRADES,
BRIGHT, ANNEALED, COPPERED, TINNED AND GALVANIZED;
Iron and Steel Wire Rods;
EXTRA QUALITIES OF BAR IRON AND RODS.
Best Qualities of Gun-Screw and Charcoal Iron Wire; Crucible, Siemens-Martin and Bessemer Steel Wire.
Wire Straightened and Cut to Lengths.
New York Office, COOPER, HEWITT & CO., 17 Burling Slip.
Philadelphia Office, JOHN HEWITT, Agent, 21 North Fourth St.

IRON AND STEEL WIRE ROPE
For Hoisting, Running & Standing Ropes, Ferries, &c
CONSTANTLY KEPT ON HAND.
Address: HAZARD MFG. CO., Wilkesbarre, Luzerne Co., Pa.

FELTEN & GUILLEAUME,
Carlswerk, near Cologne, Germany.
PATENT CRUCIBLE STEEL WIRE,
For Mining and Plow Ropes, Hawsers and Bridge Cables.
SIEMENS-MARTIN AND BESSEMER STEEL WIRE,
Flusseisen, Swedish and German Charcoal Wire.
GALVANIZED TELEGRAPH WIRE
of Charcoal and Swedish Iron and Steel, also with high conductivity, and in long lengths.
GALVANIZED STEEL WIRE,
For Plain, Barb and Strand Fencing, 3, 4 and 7-ply Strand, Staples, &c. Annealed and Oiled Fencing Wire, round and oval.
WIRE ROPE
OF EVERY DESCRIPTION.
TELEGRAPH CABLES.
Contractors to the German and Foreign governments. The oldest house in the branch on the Continent. Telegraph Address, CARLSWERK, COLOGNE.
General Agents for U. S. and Canada,
PERKINS & CHOATE, 23 Nassau St., N. Y.

A. LESCHEN & SON,
Manufacturers of
WIRE ROPE
OF EVERY DESCRIPTION.
919 to 925 N. Main St., ST. LOUIS, MO. Correspondence invited.

Dry Rooms.

In almost all manufacturing establishments a drying-room is a necessary attachment. At some period in the work it is commonly necessary to submit the material to a thorough wetting, and it is also desirable that after this ordeal the water should be removed from it as soon as practicable. But while there are tens of thousands of drying-rooms in this country, it is a curious circumstance that hardly any of them have been constructed on scientific principles. A vast amount of thought and attention has been bestowed in perfecting the various processes of manufacture, but the process of drying is in almost as crude a condition as it was 100 years ago. The main object seems to be to get the drying-room as hot as it is safe to have it, and then place in it the material to be dried. One result of this plan is that fires in drying-rooms are of frequent occurrence, and for this reason the Boston Manufacturers' Mutual Fire Insurance Company has entered on a scientific investigation of the subject. The first report which has been made to its members is restricted to pointing out a few defects in the various systems now in use. For example, the opinion seems to be commonly received that if the air in a room is made sufficiently hot, and wet material is then put in, it will soon become dry, although no change of air may take place. Consequently, there is no attempt made to ventilate the room. Now, in reality, a cubic foot of air will hold only a given amount of moisture, this varying with the temperature. At 32° F. a cubic foot of air contains two grains of vapor, while at 97° F. of heat a cubic foot of air can contain about 18 grains of vapor. But this is its maximum limit, and when once that amount of moisture has been absorbed, the air is good for nothing for drying purposes, and the sooner it is let out the better. Where no special provision is made for its exit it has to work its way, as best it can, through the cracks in the room. In many cases this same air is drawn off, reheated, and forced into the room again, on the mistaken theory that it is better than fresh, but cooler, air from the outside would be; but the effect of this is to send damp air to do what should be the work of dry air. Theoretically, the true principle would seem to be to refrigerate air, so as to deprive it of its moisture; then heat it and bring it in contact with the material that is to be dried, after which it may be allowed to escape, carrying its burden of moisture with it. In the investigation referred to, the practical method of doing this has not yet been determined, but it is hoped that a satisfactory and rational plan will be developed.

Among some tools found in a temple in Thebes was a square, which is the most satisfactory evidence we have of the early use of this instrument. From marks upon it, it has been estimated to have been made nearly 35 centuries ago. Since the arts in Egypt at that time were at the hight of their development, the square must have been known for some time previous, and therefore it is believed that the use of the square dates back not less than 4000 years. The square known to the ancients, and the tool with which they accomplished marvels of construction and calculation, was not, by any means, the square known to mechanics of the present day. This instrument as now employed, with blade and tongue and heel and the graduated lines which appear upon its surface, is an invention known only within a comparatively short time. The square, as an instrument, has been brought to its present state of perfection within a very few years.

The Ferracute Machine Company, Bridgeton, manufacturers of presses, dies and other sheet-metal tools, are extremely busy, running 60 men, with work on hand for three months ahead. Among other orders they have two from Russia for large power presses and dies, two from Germany, one from Australia, and an order for a large press and a lot of dies from the Japanese Government. They have just contracted to build 1000 patent soldering machines, which are to be made on the duplicate system, using in their manufacture limit gauges, &c., thus making all the parts interchangeable. They are also very busy with their regular canners' orders.

Astronomy, says the Norristown *Herald*, is a beautiful science. We are told that if a railway were run from the earth to the nearest fixed stars and the fare were one penny for every 100 miles, and if you took a mass of gold to the ticket office equal to $3,800,000,000—it would not be sufficient to pay for a ticket to the nearest fixed star aforesaid. If this be the case, it matters very little to us whether such a railroad is ever constructed. It would be mighty discouraging to go to the ticket office with a mass of gold equal to $3,800,000,000 and be informed that the fare was $5,678,032,000. If the ticket agent wouldn't trust until we got back, we'd be compelled to forego the trip.

Fire Test of Iron Shutters.

The following account of the trial of some shutters by the Corrugated Metal Company, of East Berlin, Conn., is from one of the local papers, and contains points the perusal of which may be of interest to our readers:

In one corner of the yard was located a building about 10 feet square, with a 3 x 6 opening in each side, and into these were fitted the four different styles of fire-proof shutters manufactured by the company, viz.: Single and double-thick box doors, and a wood shutter door covered with tin. The inside of the building was completely filled to the top of the wall—about 10 feet high—with hard wood thoroughly saturated with kerosene oil and covered over the top with corrugated iron to confine the heat. The shutters were all placed in exactly the same exposure, and the fire was lighted. It soon began to burn fiercely, but for the first half hour it did not show itself on any of the shutters, but so great was the heat the walls commenced cracking. The first signs of giving way under this severe heat were shown in about half an hour by the wood shutter covered with tin, which commenced to emit smoke and wood oil through the holes in the tin where the latches and stays were bolted on. The corrugated iron shutters at this time showed no effect of the heat, except the single-thick shutter, which became quite warm, so that the paint commenced to smoke. The box door was so cool that a person could hold his hand on it. At the end of an hour the wood shutter covered with tin, which had been for some time throwing off streams of smoke through the cracks, showed unmistakable signs of giving out, and had it not been for the heavy iron bands forming the outer frame it would have fallen from its place. The single thickness corrugated iron shutter was at the same time so hot that the paint was all burned off, and the others began to show the intense heat by the burning paint on the outside, but still held their places, and beyond the burning paint showed no signs of distress. It now became evident that the wood shutter covered with tin could not withstand this severe heat much longer, and soon the flames were seen to eat through it at the top, showing that the inside cover of tin had been burned off and the shutter as a fire protection was useless. The corrugated shutters held their places firmly and closely to the wall. At the end of three hours the fire had nearly subsided, and the shutters were all opened out for examination. On the inside of the wood shutter covered with tin, a large hole had been burned through the inside covering, and when the shutter was opened, about one-half of the inside woodwork dropped out, a mass of burned and charred wood. The shutter had evidently been held together by the wrought iron band about the outside, and the strap pieces forming the hinges, which were all firmly bolted through and through with large washers inside—a form of construction without which the shutter no doubt would have failed completely to do the duty. As it was, it came out of the fire in a very damaged and useless condition, while the corrugated iron shutters were apparently as good as new, except the single thickness shutter, which was warped a very little on one lower corner, but not enough to allow the fire to leak through. The test was witnessed by several persons, but it is to be much regretted that it had not been more generally advertised, so that more of the large manufacturing companies, to whom fire-proof construction is such an important item, could have been represented. The test was very satisfactory indeed, since it showed the merits of corrugated iron shutters over wood covered with tin. For moderate exposure the wood shutters stood a good test. The building with the shutters still attached is to be left standing, so that parties interested in fire-proof shutters can see the results of the trial if they wish.

The English Admiralty have recently made several more tests of armor plate, to ascertain the penetration of chilled Palliser hot. In all three cases the penetration was

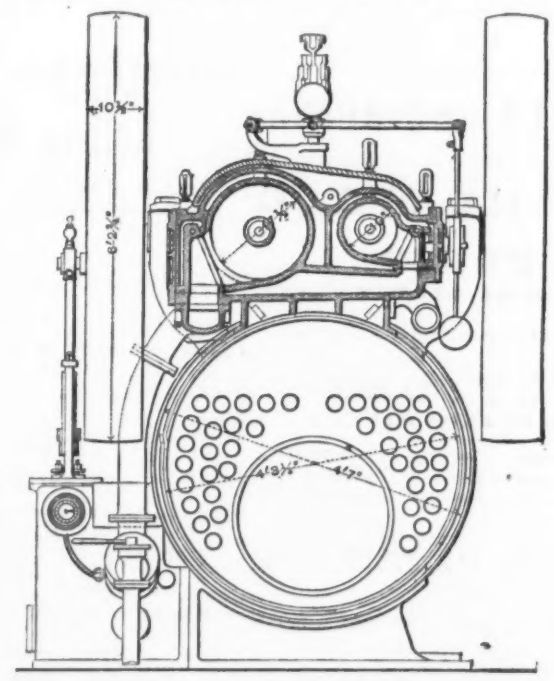


Fig. 3.—Vertical Section through the Cylinders.—See page 1.

Iron.

NEW YORK.

OGDEN & WALLACE,
85, 87, 89 & 91 Elm St., New York.
Iron and Steel
Of every description kept in stock.
Agents for Park Brother & Co.'s
BLACK DIAMOND STEEL.
All sizes of Cast and Machinery Steel constantly on hand.

PIERSON & CO.,
24 Broadway, New York City.
Iron & Steel.
COMMON & REFINED IRON,
Hoops, Rods, Scrolls, Bands, Ovals, Horse Shoe, Nail Rods, Steel, &c.
Orders promptly filled from stock.

ABEEL BROTHERS,
Established 1764 by ABEEL & BYVANCK,
Iron Merchants,
190 South Street and 365 Water, N. Y.
ULSTER IRON
A full assortment of all sizes constantly on hand.
Refined Iron,
Horse-Shoe Iron,
Common Iron,
Band, Hoop and Scroll Iron.
Sheet Iron,
Norway Nail Rods,
Norway Shapes,
Cast, Spring and Tire Steel, etc.

A. R. WHITNEY,
Manufacturer of and Dealer in
IRON
Our specialty is in
Manufacturing Iron Used in the Construction of Fire-Proof Buildings, Bridges, &c.
Agent for
Carnegie Bros. & Co., Limited, Pittsburgh, Pa., Wrought Iron Beams and Channel Iron.
Bay State Iron Co., Boston, Mass., Boiler Plate and Tank Iron.
Naylor & Co., Boston, Mass., Homogeneous Steel Plates and Compressed Steel Shafting.
Plates Rolled to 100 Inches.
Plans and estimates furnished, and contracts made for erecting Iron Structures of every description. Books containing cuts of all Iron made sent on application by mail.
Sample pieces at office. Please address
58 Hudson Street, New York.

BORDEN & LOVELL,
Commission Merchants
70 & 71 West St.,
Wm. Borden, L. N. Lovell, — New York.
Agents for the sale of
Fall River Iron Co.'s Nails, Bands, Hoops & Rods.
AND
Borden Mining Company's Cumberland Coals.

WILLIAM H. WALLACE & CO.,
IRON MERCHANTS
Cor. Albany & Washington Sts.
NEW YORK CITY.
M. H. Wallace. Wm. Bispham.

Iron.

NEW YORK.

A. B. Warner & Son,
IRON MERCHANTS,
28 & 29 West and 52 Washington Sts.
BOILER PLATE,
Boiler Tubes, Angle, Tee & Girder Iron Boiler and Tank Rivets.
Sole Agents for the celebrated
"Eureka," Pennocks,
"Wawasset," Lukens,
Brands of Iron. Also all descriptions of Plate, Sheet, and Gasometer Iron. Special attention to Locomotive Iron. Fire Box Iron a specialty.

ROME MERCHANT IRON MILLS,
ROME, N. Y.,
Manufacturers of the best grade of
Bar Iron, Bands and Fine Hoops.
Scrolls, Ovals, Half Ovals, Half Rounds, Hexagon and Horse Shoe Iron. Also from Charcoal Pig a superior quality of Iron branded J. G. All puddled balls reduced by hammer. Orders may be sent to the Mill or to J. O. CARPENTER, our Agent, at 59 John Street, New York.

REDCAR
FOUNDRY PIG IRON
In lots to suit. Also,
Old Rails, Scrap Iron, Crop Ends, Old Car Wheels, &c.
FOX & DRUMMOND,
68 WALL ST., NEW YORK.

MARSHALL LEFFERTS & CO.,
90 Beekman St., New York City,
MANUFACTURER AND DEALER.
Galvanized Sheet Iron,
1st and 2d Qualities.
Galvanized Wire, Telegraph and Fence; Galvanized Hoop and Band Iron, Galvanized Rod and Bar Iron, Galvanized Nails, Galvanized Chain, Galvanized Iron Pipe.
CORRUGATED SHEET IRON
For Roofing, &c., Galvanized, Plain or Painted.
Best Charcoal, Best Refined and Common
SHEET IRON.
Plate and Tank Iron,
C No. 1, C H No. 1, C H No. 1 Flange, Best Flange Best Flange Fire Box, Circles.
BOILER IRON
Stamped and Guaranteed.
All descriptions of Iron Work Galvanized or Tinned to order.
Price list and quotations sent upon application.

JAMES WILLIAMSON & CO.,
SCOTCH AND AMERICAN
PIG IRON,
No. 69 Wall St., New York.

ULSTER IRON WORKS.
90 Broadway, New York.

Tuckerman, Mulligan & Co
CARMICHAEL & EMMENS
130, 132 & 134 Cedar St., New York.
DEALERS IN
IRON AND STEEL BOILER PLATE.
Lap-Welded Boiler Tubes, &c., &c.
Agent for Otis' celebrated Cast Steel Boiler Plates, The Coatesville Iron Co., Pottstown Iron Co., The Laurel Rolling Mills, and Union Tube Works; Wrought Iron Beams, Angles, Tees, Rivets, &c.

Iron.

NEW YORK.

JOHN W. QUINCY & CO.,
98 William Street, New York.
Anthracite & Charcoal Pig Irons,
Wrought Scrap, Cut Nails, Copper,
BLOCK TIN, LEAD, SPELTER, ANTIMONY, NICKEL, &c.

HARRISON & GILLOON
IRON AND METAL DEALERS,
358, 360, 362 WATER ST., and 302, 304, 306 CHERRY ST.,
NEW YORK,
have on hand, and offer for sale, the following:
Scotch and American Pig Iron, Wrought, Cast and Machinery Scrap Iron, Car-Wheels, Axles and Heavy Wrought Iron; also old Copper, Composition, Brass, Lead, Pewter, Zinc, &c.

OXFORD IRON CO.,
(B. G. CLARKE, Receiver,)
Cut Nails
AND
SPIKES.
J. S. SCRANTON, Sales Agent,
81, 83 and 85 Washington Street,
NEW YORK.

BURDEN'S
HORSE SHOES.
"Burden Best"
Iron
Boiler Rivets.
The Burden Iron Company
Troy, N. Y.

ULSTER
AND
BURDEN'S
H. B. & S. Bar Iron.
Also Best Grades of
American & English Refined Iron.
All sizes and shapes in stock.
EGLESTON BROS. & CO.,
166 South St., 267 Front St., NEW YORK CITY.

Glengarnock and Carnbroe
SCOTCH PIG IRON.
For spot delivery and for prompt or forward shipments to New York, Boston, Philadelphia, Baltimore or New Orleans.
For sale in lots to suit by
JAMES LEE & CO.,
Sole Agents for the United States,
72 Pine Street, New York.

DESPARD BROTHERS,
60 Wall St., New York. P. O. Box 764.
Importers of
New and Old Rails, Steel Blooms,
SCRAP IRON, &c.
Duty paid or in bond.

HUGH W. ADAMS & CO.,
IMPORTERS OF
SCOTCH AND ENGLISH IRONS,
Agents for American Charcoal and Anthracite Furnaces,
56 Pine Street, New York.
Hugh W. Adams. Daniel L. Cobb.

B. F. JUDSON,
Importer of and Dealer in
SCOTCH AND AMERICAN
Pig Iron,
Wrought & Cast Scrap Iron,
OLD METALS.
457 & 459 Water St., 233 & 235 South St., NEW YORK.

Powerville Rolling Mill,
Manufacturer of
HORSE SHOE IRON
JOHN LEONARD, 450 West St., N. Y.

Iron.

PITTSBURGH.

W. D. WOOD & CO.'S

PATENT
Planished Sheet Iron.
Patented March 14th, 1865; April 8th, 1873; Sept. 9th, 1873; Oct. 6th, 1874; Jan. 11, 1876.
Guaranteed fully equal in all respects to the
IMPORTED RUSSIA IRON,
and at a much less price.
FOR SALE,
by all the principal
METAL DEALERS
In the Large cities throughout
THE UNITED STATES.
And at their Office.
111 Water Street, PITTSBURGH, PA.

C. KANE,
OLD RAILS, SCRAP IRON, STEEL,
PIG IRON, BLOOMS,
AND ORE.
PITTSBURGH, PA.

Wm. Rea, Prest. Saml. Bailey Jr., Secy.
F. B. Laughlin, Vice-Prest. W. A. Shaw, Treas.
UNION STORAGE CO.
RECEIVE ON
Storage and Issue Warrants
ON
PIG IRON, BLOOMS, INGOTS, MUCK BAR, RAILS, &c.
Correspondence relative to establishment of yards at furnaces solicited.
General Office, PITTSBURGH, PA.

Iron.

PITTSBURGH.

STEEL TOE CALKS.
Extra Quality Homogeneous Steel
BOILER PLATE
STEEL PLATES, all descriptions.
Cut Nails and Spikes, Plate and Sheet Iron, all descriptions.
SHOENBERGER & CO., Pittsburgh, Pa.

KEYSTONE ROLLING MILL, Limited,
Manufacturers of
IRON,
Pittsburgh, - - - Pa.

Bonnell, Botsford & Co.,
Iron, Nails & Spikes.
YOUNGSTOWN, OHIO.

MARSHALL IRON CO.,
Manufacturers of
Best Charcoal Bloom, Best Refined & Common
SHEET IRON.
Office and Mills, *Newport, Delaware.*

Sable Iron and Nail Works.

ZUG & CO.,
Manufacturers of the Celebrated
Sable Nails
Office and Works,
PITTSBURGH, PA.

LEECHBURG IRON WORKS.
KIRKPATRICK & CO.,
Manufacturers of all grades of
FINE SHEET IRONS,
(Refined Cold Rolled, Show Card, Stamping, Tea Tray, Polished, Shovel, Ferrule Iron, &c.)
NATURAL GAS USED AS FUEL.
OFFICE, No. 143 First Ave., Pittsburgh, Pa. *WORKS, Leechburg, Pa.*

DANIEL F. COONEY,
(Late of and successor to Jas. H. Holdane & Co.)
88 Washington St., N. Y.
BOILER PLATES & SHEET IRON,
LAP-WELDED BOILER FLUES,
Boiler Rivets, Angle & T Iron, Cut Nails & Spikes.
Agency for Glasgow Iron Co., Jos. L. Bailey & Co., Pine Iron Works, Lebanon Rolling Mills, Chester Pipe and Tube Co., Albany & Rens. Iron & Steel Co.'s celebrated Boiler Rivets; Homogeneous Steel, Boiler and Fire Box Plates.

S. CHENEY & SON
Manlius, N. Y.,
Small Gray Iron Castings.
We warrant our work for smoothness and finish.
Joseph P. Reed. R. Hope Hepburn.
JOSEPH P. REED & CO.,
Iron Brokers and Commission Merchants,
265 S. Fourth St., Philadelphia.
Sole Agents for
RIDGEVIEW COAL AND COKE CO., Latrobe.
J. D. BOYLE'S CONNELLSVILLE COKE.
HARRISON & WALKER'S FIRE BRICKS.
MAGNETIC and HEMATITE IRON ORES a Specialty.

Agency of
N. M. HÖGLUND'S SONS & CO., Stockholm.
Swedish & Norway Iron
of every description. Stock on hand at Boston, New York and Philadelphia. Importation orders a specialty.
GUSTAF LUNDBERG, 38 Kilby st., Boston.
ALBERT POTTS, Philadelphia Agent, 234 & 236 N. Front Street.

CHARLES HUBBARD,
"Sheridan" & "Leesport" Brands Pig Iron,
WHITE IRON (Anthracite & Bessemer)
Stock for making strong castings.
"CHARCOAL PIG IRON,"
"Maiden Creek" and "Garrick" brands.
Favorite brands of Scotch Pig Iron,
In stock and to arrive.
OLD CAR WHEELS, BEST BRANDS.
46 Cliff St., New York City.

FOR SALE.
TWO UNCUT ROLLS FOR A 16-INCH MILL.
ABOUT 10 TONS 1⅛-IN. SQUARE BAR IRON.
ABOUT 4 TONS 1½-IN. SQUARE BAR IRON.
ABOUT 7 TONS 1⅝-IN. SQUARE BAR IRON.
Also, a small lot of other sizes, by
DANIEL W. RICHARDS & CO., 92 Mangin St., N. Y.

PASSAIC ROLLING MILL CO.,
Manufacture and have always in stock
ROLLED IRON BEAMS,
Channels, Angles, Tees, Merchant Bars, Riveted Work, Forgings, Eye Bars, &c.
PATERSON, N. J.
Room 45, Astor House, New York.

CUT NAILS,
Hot Pressed Nuts, Bolts, Washers, &c.
DOVER IRON CO.'S
BOILER RIVETS,
Boiler Brace Jaws, Socket Bolts, &c.
FULLER BROTHERS & CO.
139 Greenwich Street, New York.

about 6 inches, the steel point of each shot embedding itself in the armor, and the remainder of the shot being shattered by the force of the concussion. The first two projectiles occasioned two or three cracks, which were superficial, but two of them were developed by the final round until they almost extended through the entire thickness of the plate. The test, however, was considered to be of a satisfactory character, its severity being indicated by the fact that the velocity of the missile used was 1420 feet per second. The energy at the muzzle was 3486 feet.

Tool Dressing.

There are few jobs in the machine shop that make so much general annoyance as that of tool dressing. The machinist has his own personal notion of the style and shape, the hardening and temper of the tool he uses, and the tool dresser in the smithy must ignore all his experience and observation, for the time being, to cater to the machinist's whim. In short, the forger becomes only a helper to the fancy of the machinist. On the other hand, the machinist has frequently to encounter the obstinate peculiarities of the forger, who insists on teaching the machinist about work he alone understands. Good forgers dislike the job of tool dressing because of its annoyance, and so it frequently happens that this work is bandied about in the smith shop until it rests at last with the least careful man. Some machinists also insist in dabbling at the forge and greatly annoy the smith by their meddling. Indeed, this interference is carried much too far for the benefit of good order, proper work and reasonable profit. It is too much the custom to consider the tool dresser as a man at call for the machinist, and where every lathe and planer hand has his own whimsey they make it somewhat lively for the smith.

To such an extent is this personal whim carried that there are few machine shops where there is a uniformity in shape of alterable tools; at every lathe and planer the tools differ in form or vary in temper—the workman is known by this peculiarity as much as by his personal name. There is no proper reason why this should be, any more than that each workman should alter the size and change the shape of rule or gauge. There are determinate and exact forms for turning and planing tools adapted to cast iron, wrought iron, steel and brass, and these forms, once ascertained, should be kept and used as standards for the shop. Models of tools should be kept for exemplars and no departure from these should be allowed except for special cause and for particular work.

One of the most common faults with the ordinary turning and planing tools in use in our machine shops is the excessive clearance—they are not made and ground to the right angle to keep down to the work, but are so constructed that the point and cutting edge alone offer resistance, as well as alone do the cutting. There is no sense in this except that with a tool so constructed the workman can plow, and gouge, and dig, and make great pretense of work, and then blame the iron in the casting and the iron in the shaft for the irregularities of surface when it comes from planer or lathe. The cutting portion—point or edge—of a tool for such rigid material as iron or steel, should be as nearly on the moving plane of the work as possible, and the heel of the planer tool should be raised as slightly as possible above the level of the cutting point. To be sure, such a construction necessitates more frequent grinding, perhaps, when the work is rough and demanding; but it gives better results, and when there is after-finishing to be done it will pay the proprietor, if it does not please the piece operator.

The increasing use of hydraulic machinery for riveting, flanging, &c., in our iron works, renders the question relating to the freezing of the water in this machinery a very important one. Adding to the water some methylated alcohol, salts or glycerine has been recommended by many. Mr. Twedell made several experiments in regard to the behavior of the glycerine when added, and found that with a temperature of 180° F., at which temperature pure water rapidly freezes, only a small piece of ice was formed. The addition of salt would undoubtedly be much cheaper were it not for its chemical action on cast iron and on the leather packing employed. Glycerine, on the contrary, exerts a beneficial influence on the latter, tending to preserve it for a greater length of time.

An improved steam-engine governor has been patented by Mr. John W. Peck, of Evansville, Ind. This invention relates to devices which are more particularly intended for use in connection with what is known as the "Corliss" engine, the object being to provide means for quickly stopping the engine in case of accident. The improvement consists in the combination, with the cut-off valve gear, of one or more independent stop cams, located on the same moving part with the cut off cams, and a detachable connection with the governor, which transmits the normal action of the governor to the cut off cams, but which at will may be broken to allow the stop cam to throw the cut off gear out of action and stop the induction of steam.

The compound of india rubber and asbestus, which is to some extent a new combination, is now used as a packing for valves, its peculiar properties rendering it particularly fit for this purpose. For range valves or high-pressure hot-water cocks, it appears invaluable. As it contains no wire it can be cut to any required size, and will stand any temperature; at present it is used most for packing steam joints and large valves.

The following method of piercing glass for optical and other work is recommended. The boring instrument is heated to a white heat, and is then plunged into a mercury bath, by which operation it acquires an extraordinary durability. By a liberal application of a solution of camphor in spirit of turpentine to the glass, the instrument will pierce it as easily as though it were wood.

Fire Protection in Mills and Factories.*

BY C. J. H. WOODBURY.

The reduction of taxation furthers prosperity by adding to the accumulations of industry and increasing the capital in a community. The fire tax is the heaviest single tax in this country; the cost of fire insurance and fire departments together has amounted to over $125,000,000 annually during the last five years. If the losses can be decreased the cost of insurance will diminish in like ratio.

The question of defense against fire obtains but little attention from those in charge of property, the whole matter being abandoned to the public fire departments, in a manner that is without parallel in shifting the other responsibilities of business. This is, indeed, a tribute to the efficiency of fire departments; and were not that portion of our local governments administered with extraordinary ability, our cities would constantly be ravaged by conflagrations.

PLANS OF ORGANIZATION.

There are numerous plans of fire organization, and the details differ with the conditions and administration of each establishment, but this principle is the salient point in all—giving instruction in the use of apparatus by actual trial and work, and not by precept only. The less talk and printing about the matter the better. The following plan has proved successful in practical application: Let each man in the fire organization be assigned to a particular class of duties, and when an alarm sounds let him go to his appointed position and then await orders. A printed card like the following should be posted in each room.

Fig. 1.—Badge for Mill Fire Organization.

FIRE ORGANIZATION OF MILL.

Chief	The agent
First Assistant Foreman	
Second "	
To stop and start engine (or wheels)	
Assistants	
To put pumps in gear and stay by them	
Assistants	
Foreman of hose	
Assistant foreman of hose	
Leading hosemen	

The hosemen should be selected from men employed at different parts of the establishment. The overseers should not form a part of the organization, except to remain in their rooms, and there be subject to the orders of the chief. Now for the mode of working. At regular times for trials of apparatus, as every second and fourth Saturday in each of the warm months, let the clerks of companies summon a meeting of the men in the yard at an appointed hour. He may say "there is a fire in the repair shop," or at any other designated place. If the water wheels are running the wheelman, without any further orders, shuts down at once; the pump men put their pumps in gear, and the foremen of leading hose directs his men where and how much hose to connect, and as soon as he is ready the word is passed to the wheelman, and the pumps are started. Then, after the original order is given, the chief leaves the men to do as their own judgement prompts them; and if they do it well, and get the water on the desired point without delay and without mistakes, it will make them feel confidence in themselves, and render them are made they will remember them and cool in case of actual fire, and if mistakes avoid the like the next time. Let this plan or a like one be adopted at every meeting, and the men will get the habit of doing their work easily and rapidly, and if the chief be present when a fire occurs he will not have to bawl and holloo to a crazy crowd, who work hard and do nothing; and if absent he may feel that all will be done well if any call comes.

It is of the utmost importance that the watchmen, who may often constitute the whole force on the premises, should be specially drilled in the use of the apparatus and instructed what to do in case of fire. In smaller mills, where the number of repair hands or skilled mechanics is insufficient to form the whole of a fire company, some of the members must be selected from the operatives, and in such places it is frequently alleged that there is a difficulty in maintaining a fire organization in full numbers and efficiency because the help are changing so frequently. In other matters no such excuse was ever offered to justify the stopping of any profitable machine or process. In such a class of mills it has proved useful to furnish each member of th organization with a metal badge, about the size of a silver dollar (see Fig. 1), with the name of the mills and the wearer's position in the mill fire organization engraved upon it. This is ordinarily worn on the vest of the possessor, and in case he leaves the employment or even goes temporarily away from the neighborhood of the mill, this pin is given to his successor, or to his substitute for the time being. This plan continually reminds one of his duty, and secures a full organization always in the vicinity of the property.

WATER SUPPLY FOR FIRE PURPOSES.

It is a difficult task to determine the minimum limit of water supply for fire purposes; there is no maximum. In fact, those fires which are put out by water are generally extinguished by small quantities, but such general results do not grant a release of one from making arrangements for the largest possible amount of water. The fundamental axiom relating to mill water supply is not found in the works of Rankine or Weisbach, but Benjamin Franklin's aphorism, "Don't put all your eggs in one basket." In different sources of supply, in different pumping apparatus, in different means of application, everything is in duplicate, so that an injury to a part will not disable the whole. There is no arbitrary standard of the quantity of water necessary for fire purposes. The most essential fire apparatus consists of pails of water. Their importance is shown by the fact that, as a matter of record of the losses in mills paid for by the insurance companies, twice as many fires are put out by pails as by any other means. These pails must be kept full and used for no other purpose whatever. The best fire pails are made of strong galvanized iron without covers, and they will last much longer if painted with hot coal tar or some of the asphaltum roofing compounds.

FIRE PUMPS.

Fire pumps differ from other classes of pumps according to their entirely different duty to perform. Paramount to all other conditions is the ability to withstand neglect and rough usage, start quickly, at all times throw large quantities of water, and maintain a constant pressure. They are of two classes—direct steam pumps and rotary pumps.

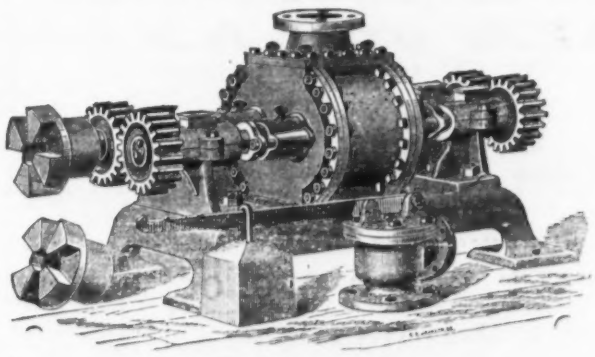


Fig. 2.—Rotary Pump and Connection.

ROTARY FIRE PUMPS.

The rotary pump (Fig. 2) is a coarse, mechanical movement, and yet, for mill purposes, it is the best pump ever made. There are no valves requiring attention or small parts to break; it wears out slowly, and can be repaired almost indefinitely. A pump of given size and weight will move a greater mass of water than any other class of pumps. The first rotary (and, in fact, it is the first mill fire pump) ever used in this country is in good working order at Allendale, R. I.

A rotary cannot lift water successfully, therefore it should take its supply from the flume. I do not advise that it be placed so low that the water will run into it, but about two feet above the water level. When a pump is set below the water level—submerged as it is called—there must be a stop valve in the suction pipe; the water may

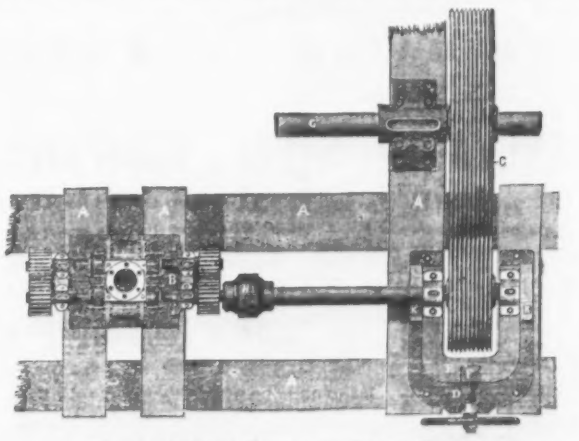


Fig. 3.—Friction Gearing for Rotary Pump.

* Abstract of a paper partly read at the New York meeting of the American Society of Mechanical Engineers. To be shortly published in book form by John Wiley & Son.

percolate by this valve and freezing obstruct the pipe and frequently break the pump, or some one will forget to open the valve in an emergency, and all concerned will declare that some inscrutable providence kept the pump from working.

Rotaries should never be driven by belts, and bevel gears are objectionable. The usual method of driving them is by spur-gear wheels, directly from the jack-shaft, but the preferable method is by friction-gears, which consist of wheels with wedge-shaped tongues and grooves turned upon their peripheries, which engage with each other. (See Fig. 3.) When ordinary toothed gear is used the wheels must be stopped, before engaging or disengaging the gears, or there is almost a certainty that they will

Fig. 4.—Double Hydrant.

be broken by the shock. With this apparatus the pump can be started without shock or jar with the wheel running at full speed

FRICTION GEARING FOR DRIVING ROTARY FIRE PUMPS.

The following brief explanation will make the engraving understood: The framework A, A, A, A, supports the pump B, and the bearing for the driving shaft C, with its gear, in the usual manner; it also supports the plate D, on which slides the plate E, carrying with it the short pump shaft and driving gear. The two gears are thrown into or out of mesh by means of the hand-wheel and screw D. The hand-wheel may be placed in any convenient position for operating the screw, and connected with the screw D by shafts and bevel wheels. When practicable, it is advisable to have the rotary pump driven by a separate water wheel, or, if driven by the main wheels, have a clutch in the main shaft, so that the fire will not be spread by the currents of air caused by moving mechanism.

A rotary pump should have ample check valve in the force pipe, to prevent the water in the pipes turning the pump backward when the motive power is removed. Check valves are rarely of sufficient capacity. There should be a pet-cock in the top of the pump, always left open when the pump is not forcing water, to enable the pump to force out the air. Many pumps will not operate at all times because they cannot force the air out by lifting the check valve. This is of the utmost importance in all ex-

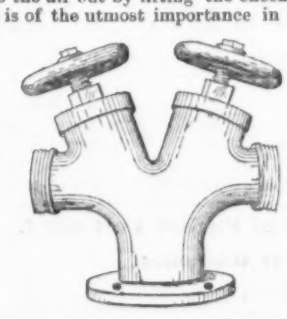


Fig. 5.—Double Valve Hydrant.

cept new rotaries, and it is to the lack of pet cocks that rotaries are so uncertain in their action. Sometimes they seem endowed with that "total depravity of inanimate things" which is a clause in the creed of many. It is unadvisable to use the rotary pumps for practice during freezing weather, but at such times the pumps should be moved by hand every week.

STEAM FIRE PUMPS.

Steam fire pumps differ from other pumps in the relative proportions which the steam cylinder bears to the pump, the diameter being 2 to 1, so that the steam pressure is to that of the water as 1 to 4, minus the friction of the whole machine. This qualifies the pump for efficient work when the steam pressure is very low, as it is apt to be during nights or Sundays. They are provided with large water passages and swing bolts or hand holes, so the interior can be examined at short notice. The first steam fire pumps were made by Frank Curtis, of Newburyport, after suggestions of Mr. Wm. B. Whiting, the vice-president and secretary of the Boston Manufacturers' Mutual Fire Insurance Company.

The steam fire pump should be set so as to draw its supply from the wheel-pit, that it may be independent of the supply in the mill pond, and be used to empty the wheel-pit in case of repairs or renewals about the wheel. It is the general custom to use soft rubber valves in this class of pumps, but efficient, sure action is here paramount to the quiet, smooth operation of rubber valves. The refuse of lubricating oils, wool scouring and dyeing collect in the tail race

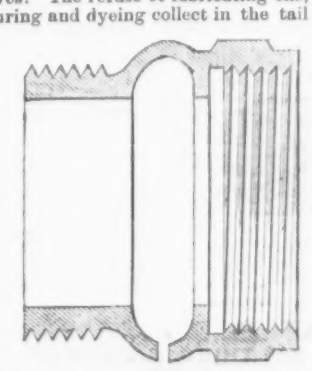


Fig. 6.—Section of a Drip Coupling.

of a mill. Many of these substances, especially oils, affect such soft rubber valves, sticking them to their seats so firmly that they can only be removed by cutting under with a thin knife. The ordinary substitute for soft rubber pump valves is brass, but brass valves are soon cut by the grit suspended in the water, and then leaking begins. In pumps of this character I know of nothing better than Jenkins's valves. I have tried the endurance of the material by immersing pieces of it for several months in the oils and corrosive chemicals used in cotton and wool manufacturing and dyeing, and it was not in the least affected by any of these substances. Where oils, dye-stuffs or chemicals are discharged into the stream, and there is any liability that they will be drawn into the pumps, Jenkins's valves should be used, but for ordinary service with pure water, soft rubber valves are satisfactory, as they form a tight and noiseless valve. If a steam fire pump is let alone, it will be discharged by rust, and to insure its frequent use without wearing it out, it is advisable to connect it with the tank that supplies the sink and water-closets, so that it will be necessary to use it for a few minutes every day. Just before stopping, the cylinder of a steam pump should be lubricated with mineral oil, never using sperm or lard oils or tallow. If the suction pipe is long, there should be a foot valve at the bottom, and especial care is necessary to arrange one of ample area of opening, so as not to throttle the water supply to the pump. A relief valve of ample capacity should be connected to the force main near the pump; it will save the hose and pipes from injuries caused by sudden or excessive pressure. The best relief valves have non-corrosive seats made of nickel, and the spiral spring holds the valve to its seat by tension instead of compression, and, therefore, the action of the valve cannot be lessened by reason of the chips, gravel and pebbles liable to collect in a valve of this

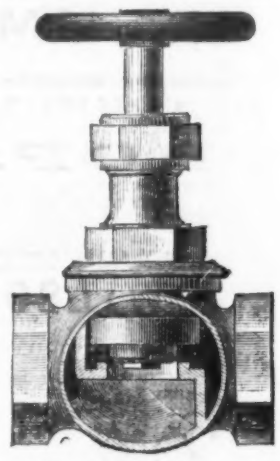


Fig. 7.—Side of Globe Valve Broken Out to Show Winding Passages and Sharp Corners.

form. Such a mishap could never happen to the well-kept steam fire engine of a city department, but it is of frequent occurrence in a country factory village, where the small boys run loose, and can give attention to such matters.

HYDRANTS.

The hydrant in general use is the common Y or branch hydrant, Figs. 4 and 5, and is not provided with any means of draining off the water when the hydrant is closed, and I suggest the advisibility of boring a hole, about 3 32ds of an inch in diameter, through the shell of the hydrant just above the seat. When the pressure is on the pipes, water remains in the upper portion of such hydrants as were closed before the pipes were drained, and also forces its way into the upper portion of every hydrant that

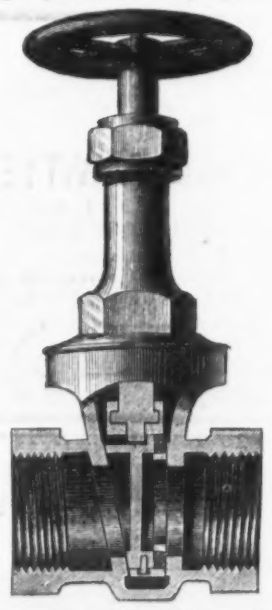


Fig. 8.—Jenkins' Straight-way Valve.

does not remain perfectly tight under the heavy pressure. The hydrants are generally tight enough to retain this entrapped water, and the hydrant caps prevent its evaporation. All valves, gates and connections should be easily accessible, and not placed in dark corners, closets or spaces under trap doors. When the purpose of the valve is not absolutely evident from its position and surroundings it should be labeled.

Yard hydrants should not be placed much nearer buildings than the hight of the walls, so that a falling wall will not injure the hydrant. The covers of gate-pits should have handles high enough to be always visible above snow, before the paths are made. Stand pipes on the fire escapes of mills are not now in vogue, as experience has shown that any fire hot enough to drive men out of the room cannot be fought from the galleries in front of the windows. Where there are several buildings, Mr. Edward Atkinson's plan of pipes running to the roof and then fitted with a system of hydrants is very efficient. The base of these pipes should be connected with the mains by a gate or to the yard hydrants by hose coupled to the lower end of the stand pipe.

A vertical pipe should extend to the hight

Cutlery.

FRIEDMANN & LAUTERJUNG,

Manufacturers of

PEN AND POCKET CUTLERY,

Solid Steel Scissors, Shears, Razors, &c.

Sole proprietors of the renowned full concave

"ELECTRIC RAZORS,"

And the celebrated **"ELECTRIC SHEARS."** Nickel Plated Bows.

Agents for the BENGALL RAZORS.

AMERICAN TABLE CUTLERY, BUTCHER KNIVES, &c.

91 Chambers and 73 Reade Sts., N. Y. 423 N. Fifth St., ST. LOUIS, MO.

THE

LAMSON & GOODNOW MFG. CO.,

Salesroom and Warehouse, 38 Chambers Street, New York City.

Factories, Shelburne Falls, Mass.

Superior Cutlery of all kinds and grades, from the finest in pearl and ivory handles to the lowest price in wood and iron handles.

OUR

BUTCHERS' and HUNTERS' KNIVES

Are warranted to be equal in style, finish and quality, to any goods made in the world.

"COMPARE, THEN JUDGE."

We are the sole owners of the *Gardner Patent Guard and Rest for Carving Forks,* and the manufacture of fine carvers is with us a specialty.

AMERICAN MADE RAZORS

J. R. TORREY,

MANUFACTURER OF

STROPS

In all Styles.

J. R. TORREY RAZOR CO.,

MANUFACTURERS OF

RAZORS.

To introduce we offer **HOLLOW GROUND RAZORS** at $1.50, $1.75, $2; Ivory, $2.50. Our **SWEDISH GEM RAZORS,** $1.75, $2, $2.50; Ivory, $3. All our own make, and warranted the best cutters in the world. As Razor makers we know what is needed to sharpen a dull razor, and will mail for 75 cts. a Strop warranted to set a fine edge to any razor. If in morocco case, $1.

Factories at **WORCESTER, MASS.** Catalogues to the trade.

JOHN WILSON'S CELEBRATED

TRADE MARK.

"FOUR PEPPERCORNS AND A DIAMOND"

GRANTED A D 1766 BY THE CORPORATION OF CUTLERS OF SHEFFIELD AND PROTECTED BY ACT OF PARLIAMENT.

REGISTERED ALSO AT WASHINGTON U.S.A. ACCORDING TO ACT OF CONGRESS.

ALSO AT LEIPZIG, IN ACCORDANCE WITH THE GERMAN TRADE MARKS' REGISTRATION ACT.

BUTCHERS' KNIVES, BUTCHERS' STEELS, AND SHOE KNIVES.

It having come to the knowledge of JOHN WILSON that Counterfeit Butchers' Knives, purporting to be of his manufacture, are being sold in the United States, he hereby cautions all purchasers of his Knives and Steels to be on the alert against such imposition.

JOHN WILSON also hereby gives Notice, that it is his determination to institute Legal Proceedings against any person or persons who may be detected infringing his Trade Mark.

Every article of JOHN WILSON'S manufacture, bears the Trade Mark, in addition to the Name.

WORKS:—SYCAMORE ST., SHEFFIELD, ENGLAND. Established 1750

Unrivaled **SHEARS.** Solid Steel **SCISSORS,** Japanned and Nickled

Manufactured of imported **English Cast Steel.**

Every Pair Warranted.

For samples and prices address,

GIFFORD MANUFACTURING CO.,

Union City, Conn.

FRANCIS T. WITTE, SUCCESSOR TO **KING, BRIGGS & CO.,**

111 Chambers St., New York.

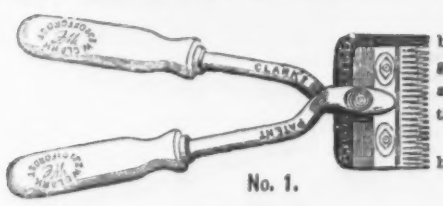
HARDWARE, CUTLERY AND GUNS.

Cash buyers are invited to send for illustrated net cash price list.

Especial attention given to Pocket and Table Cutlery.

Proprietor of "H. & J. W. KING'S" Pocket Knives, Razors and Shears.

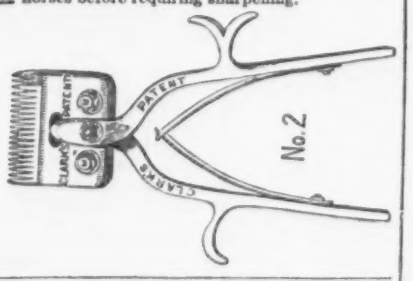
W. CLARK'S PAT. HORSE CLIPPERS.



No. 1.

No 1.—This well known instrument has now been before the public for many years, and has given universal satisfaction, and is everywhere acknowledged to be by far the best and therefore the cheapest in the market.

It has been known to clip between 200 and 300 horses before requiring sharpening.



W. Clark's Patent Clipper No. 2 for Heads.

To be obtained of all Saddlers and Ironmongers. Wholesale of the Patentee,

W. CLARK,

528, late 232 Oxford St., London, W.

And C. M. MOSEMAN & BRO., 148 Chambers St. New York.

REMOVAL.

Please notice that we have removed from **No. 295 THIRD AVENUE** to

No. 37 Warren Street, near Church St.,

Where we hope to be favored with a continuance of your generous patronage.

J. M. FARRINGTON & CO.,

Successors to DAY, FARRINGTON & CO., Manufacturers of

LOCKS, KNOBS, GONGS, BLANK KEYS,

Wrought Store Door and Flush Bolts, Silver Plated, Ornamental Bronze and other Hardware.

Cutlery.

CORPORATE MARK,

Joseph Rodgers & Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 82 Chambers Street, New York.

F. & W. CLATWORTHY, Agents.

The demand for **Joseph Rodgers & Sons'** productions having considerably increased, they have, in order to meet it, greatly extended their Manufacturing Premises and Steam power.

To distinguish Articles of **Joseph Rodgers & Sons'** Manufacture, please to see that they bear their Corporate Mark.

P. O. Box 3962.

ESTABLISHED 1836.

Alfred Field & Co.,

COMMISSION MERCHANTS,

New York, Birmingham, Sheffield, Liverpool.

Guns and Pocket Cutlery,

SPECIALTIES.

Headquarters for

ELEYS BROS.' GOODS, WRIGHT'S ANVILS,
WILSON'S BUTCHER KNIVES, &c.,
WOSTENHOLM'S POCKET CUTLERY AND RAZORS,
FIELD, FRASER & CONTINENTAL POCKET KNIVES,
BUTCHER'S FILES, TOOLS AND RAZORS,
JOSEPH ELLIOTT'S CELEBRATED RAZORS,
WESTERN FILE CO.'S FILES,
ENGLISH AND GERMAN GUNS,
ROBERT SORBY & SONS' SHEEP SHEARS,
STUBS' FILES, WESTERN FILES,
GREAVES' SHEEP SHEARS,
CHESTERMAN'S TAPES,
GERMAN COIL AND HALTERS and other CHAINS,
BRADES' TROWELS AND HOES,
CANASTOTA KNIFE CO.'S POCKET KNIVES,
Etc., Etc., Etc., Etc.

All sorts of Hardware and Merchandise for import and export purchased on commission.

Silver Medal, 1878—Paris.

JOHN SPENCER & SONS,

Albion Steel Works, Sheffield,

MANUFACTURERS OF

FILES AND STEEL,

Table Knives, Razors, Shovels, &c., &c., of every description.

CORPORATE MARK.

SPENCER SHEFFIELD

Granted 1749.

FURNESS, BANNISTER & CO.,

NEWARK, N. J.

Manufacturers of

TABLE CUTLERY.

PRICES FURNISHED ON APPLICATION.

Cutlery.

McCOY & SANDERS,

Hardware, Cutlery, &c.,

P. O. BOX 390, NEW YORK.

Sole Agents for

THEILE & QUACK'S CELEBRATED CUTLERY.
WADE BROS.' AND TYLER & CO.'S CUTLERY.
IRVING CUTLERY CO.
ELMWOOD CUTLERY CO.
SHEARS, MIDDLETOWN SHEAR CO.
WROUGHT IRON TACKLE BLOCKS.
EADES' DIFFERENTIAL PULLEYS.
PEUGEOT FRERES' FRENCH HORSE CLIPPERS.

SPECIALTIES.

WOSTENHOLM'S POCKET CUTLERY AND RAZORS.
WADE & BUTCHER'S RAZORS.
BENGAL AND GENUINE HAMBURG HOLLOW GROUND RAZORS.
JOS. RODGERS & SONS' CUTLERY.
GERMAN COIL AND HALTER CHAINS.
PLYERS, NIPPERS AND TOOLS.
CHESTERMAN'S TAPES.

Peugeot Freres' Horse Clipper.

ROBERT SORBY & SONS,

SHEFFIELD,

MANUFACTURERS OF THE CELEBRATED

Kangaroo Sheep Shears,

The best Shears made.

CORPORATE MARK.

Every Shears Guaranteed.

ALFRED FIELD & CO.,

93 Chambers St., - NEW YORK,

SOLE AGENTS.

Send for price list and terms.

ESTABLISHED 1853.

E. E. EATON,

GUNS,

AMMUNITION,

Fishing Tackle,

CUTLERY,

53 State St., Chicago.

GEORGE W. BRUCE,

1 Platt St., New York, Proprietor of the

Atlantic Screw Works,

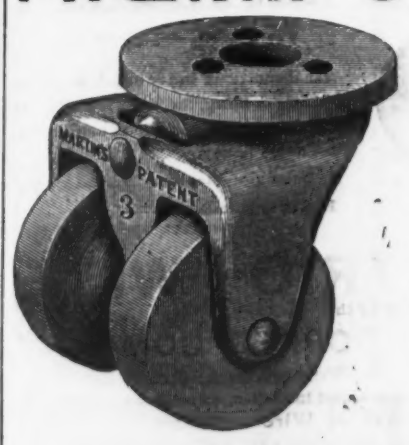
And Agent for the *Florence Tack Co.* and *C. A. Maynard*

Maynard's C. S. Planters' Hilling and Bog Hoes; Brade's Crown, Planters' and Hilling; Elwell's Weeding Planters' and Grub, and a variety of other kinds for Home and Export Trade.

Office of

PHŒNIX CASTER CO.,

Indianapolis, Ind.



Hibbard, Spencer & Co., Chicago, have sold our Casters as follows:

1879	$322.60
1880	590.92
1881 (year half out only)	823.54

We have just issued a new Catalogue, which we would be pleased to mail with terms upon application.

PHŒNIX CASTER CO.,

Manufacturers,

INDIANAPOLIS, IND.

Our Drawer is so uniform, simple, strong and effective, that it has nearly driven all competition from the field.

MARTINS ENGLISH HORSE CLIPPERS.

J. J. Shannon,

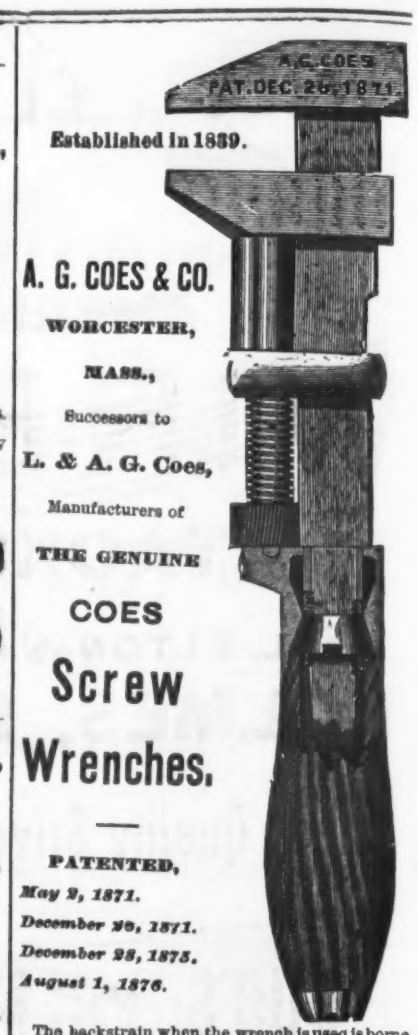
1707 Market St.,

PHILADELPHIA.

Recommended as the best Hand Clip per made.

Extra pieces for sale.

Send for circular.



Established in 1839.

A. G. COES & CO.

WORCESTER, MASS.,

Successors to

L. & A. G. Coes,

Manufacturers of

THE GENUINE

COES Screw Wrenches.

PATENTED,

May 9, 1871.
December 26, 1871.
December 28, 1875.
August 1, 1876.

The backstrain when the wrench is used is borne by the bar—not by the handle.

The strongest Wrench made, and the only successful Re-enforced Bar.

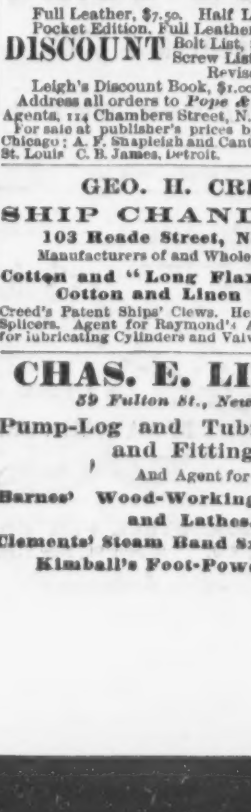
None genuine unless stamped

A. G. COES & CO.,

Our Agents, GRAHAM & HAINES, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

TRADE STANDARD GIRARD WRENCH. MARK.

WARRANTED.



FOR **STRENGTH** AND **Durability** IT HAS **NO SUPERIOR.**

GUARANTEED IN EVERY RESPECT.

Wrought Bar, Head and Screw.

Owing to the *increased demand* for these justly

Popular Wrenches,

we are now manufacturing more than any other establishment in the world.

Our Wrench having been imitated by other manufacturers, we have adopted the above Trade Mark, and will hereafter stamp all our goods.

SEND FOR TERMS and PRICES

GIRARD WRENCH MFG. CO., Girard, Pa.

LAMBERSON'S

PRICE BOOKS.

Full Leather, $7.50. Half Leather, $6.50.
Pocket Edition, Full Leather, $3.50.

DISCOUNT Bolt List, $1.00. Screw List, 50 cents. Revised April 27, 1881.

Leigh's Discount Book, $1.00.

Address all orders to *Pope & Stevens,* General Agents, 114 Chambers Street, N. Y.

For sale at publisher's prices by Wm. Blair & Co., Chicago; A. F. Shapleigh and Cantrell Hardware Co., St. Louis; C. B. James, Detroit.

GEO. H. CREED,

SHIP CHANDLERY,

103 Reade Street, New York.

Manufacturers of and Wholesale Dealers in

Cotton and "Long Flax" Sail Duck, Cotton and Linen Ravens,

Creed's Patent Ships' Clews. Heitman's Wire Rope Splicers. Agent for Raymond's American Crane Oil for lubricating Cylinders and Valves.

CHAS. E. LITTLE,

59 Fulton St., New York,

Pump-Log and Tubing Augers and Fittings,

And Agent for

Barnes' Wood-Working Machinery and Lathes.

Clements' Steam Band Saw.

Kimball's Foot-Power Band Saw.

of the porch tower, with hydrants at each story and on the roof. To each porch hydrant a length of hose should be connected and provided with a drip coupling, Fig. 6. It consists of a ring cast inside of the coupling, which suddenly diminishes the area of the opening, and any leakage of the hydrant first fills the space behind the ring, from which it flows through a small orifice, instead of wetting and destroying the hose. The hose should be doubled and wound upon a reel, beginning with the middle, so that one can take hold of the nozzle and run without being impeded by a snarling hose. After a system of water pipes and hydrants has been laid, it should be very thoroughly washed to remove the last traces of the sulphuric acid—"pickle"—used in cleaning the iron castings. This is often very imperfectly washed off in the haste of manufacturing, and the writer has seen many instances where the new hose attached to porch hydrants in mills has been destroyed by this cause, where the leakage was so slight as to be imperceptible.

In some experiments which the writer made at Holyoke, a 2-inch globe valve reduced the water pressure from 80 to 40 pounds per square inch, while a straight-way valve substituted and operating under identical conditions of supply, reduced the pressure from 80 to 71 pounds per square inch. The section of a globe valve, Fig. 7, shows its irregular winding passage, giving a great fractional resistance to the delivery of water.

Never use a valve which is without an advancing stem; it is always perplexing not to know the position of the valve, and the disaster charged to inoperative valves are generally traceable to this cause or to left-hand valves. If beyond your power to replace the left-hand valves by right-hand valves, label them by an arrow, and the word "open," painted on a piece of tin fastened to the spokes of the hand-wheel of the valves. For straight-way valves the Jenkins and the Chapman furnish good examples. The Jenkins valve presents a full opening, Fig. 8; the advancing stem shows the position of the gate, and it is a right-hand

Fig. 9.—Partial Section of Chapman Straight-way Valve.

valve with advancing stem. It is provided with Jenkins packing, which can be renewed, when necessary, in a moment by the substitution of a new ring of the packing. The Chapman valve has a gate of composition in the form of a wedge, which presses against two Babbitt metal seats, Fig. 9.

Experience has proved unlined linen hose to be the best for inside hydrant and reserve use. It is light, flexible, and strong; 12 samples from different manufacturers weighing from 3¼ to 4 ounces per foot, and bursting at pressure of 420 to 650 pounds per square inch. If kept dry, it will last for an indefinite time. It can be fairly protected from mildew by treating it by a solution of paraffine wax dissolved in naphtha. For outside use, rubber-lined cotton hose fulfills the demand for strength and durability, bursting at pressure of 800 to over 1100 pounds per square inch and weighing 12 to 20 ounces per foot. However suitable rubber-lined linen, rubber and leather hose may be for public fire departments, they are not so well adapted for mill use as the kinds mentioned above.

It is essential that all hose couplings at an establishment be uniform, and desirable that they be like those of neighboring factories and the public fire department. If there is an unavoidable difference there should be a supply of reducing couplings in accessible places.

(Continued.)

Iron Lighthouses.—Two iron lighthouses are being erected by the United States Government, one of which, just completed, is situated at the White Rock, Narragansett Bay, where the steamer Rhode Island struck. It is of cast iron, and consists of the foundation pier in three sections, 8 feet high each, and with 40 pieces in each section. Upon the top of the pier is a four-section lighthouse, crowned by the lantern, the whole being 69 feet above the water line. Other iron lighthouses are to be built for Connecticut, and also for Border Flats, Fall River.

The employees of the pipe mill of the Reading Iron Works, Reading, Pa., petitioned the company for an increase of wages, owing to the advance in prices of the necessaries of life. A committee of the employees was invited into the office, and were told that their request would be granted, also that hereafter if any were dissatisfied with their wages they should come to the office individually, and not join in a general petition, and their requests would receive proper attention. The men who received heretofore $1.50 will now, it is said, be paid $1.65, and those who received $1.80 will be paid $2 a day.

INDUSTRIAL ITEMS.

MASSACHUSETTS.

The Clinton Wire Cloth Co., of Clinton, have made extensive additions to its plant this season. No. 6 mill has been erected and is 150 by 65 feet, and has a capacity for weaving 25,000 square feet of wire cloth per day. They have also built a storehouse, two stories, 80 by 42 feet and another 31 by 134 feet. Both are fitted with steam elevators, and the two houses combined have a storage capacity of several million square feet of wire cloth. There is besides a storehouse for paints and oils, 25 by 134, in which are placed permanent tanks. A very heavy building is just finished in which the wire is stored as it comes from the mills. It will hold 3000 tons of wire. The foundation of this building is covered entirely over with granite stones two feet thick. Another building for storing patterns has a floor space of 8000 feet, and is said to be absolutely fireproof. A fine building of brick, with hammered stone trimmings, 80 by 46, adds a finish to the recent improvements. It contains the general office, with accommodations for bookkeepers and clerks, private room for manager, drafting room and superintendent's office. Most of the machinery is in position and is running. The balance will be started up within a few weeks. The capacity of this company, running day time, is 24,000,000 square feet of window-screen wire cloth per year, in addition to which must be added a full line of other wire cloth for general purposes. A new engine has recently been put in to run the mill nights, and for the past month work has continued from 6.30 o'clock Monday morning until 11.30 Saturday evening without shutting down.

The Ames Manufacturing Co. have finished the third bronze group which is to be placed on the Lincoln monument at Oak Ridge Cemetery, Springfield, Ill. The last group represents an artillery force, a group of infantry and sailors, together with a colossal statue of Lincoln, having been cast heretofore. The group weighs 4500 pounds. The work will be finished by the casting of a fourth, or cavalry group, which it will require a year to complete.

The glass works at Lenox are doing a large business, orders coming in for goods faster than they can be filled.

NEW JERSEY.

The large iron works of John F. Starr, at Camden, have been given into the hands of a committee of creditors, who will operate them until various pending contracts are finished, when some permanent arrangements will be made.

PENNSYLVANIA.

The Beaver Falls Rolling Mill is putting up an addition for a gas furnace, the capacity of which will be equal to four ordinary puddling furnaces. If this one will do the work claimed for it, several others will be put up in the spring. The gas for fuel will be manufactured at the mill for their own use. The piston-rod of the large hammer was broken last week and sent to Alliance to be repaired. It will probably be back the middle of this week. An order has been received for several hundred tons of iron.

The Kutztown Furnace is being supplied with a double pair of cylinder boilers, and the stack is also being raised so as to be 75 feet high and 36 inches in diameter. A spare set of boilers was necessary, on account of the bad water supplied for the use of the boilers, making frequent cleaning of the boilers indispensable, and in order to clean them heretofore the stopping of the furnace was necessary, a proceeding attended with much risk. The furnace is owned by the Philadelphia and Reading Coal and Iron Company, who are making the improvements. The boilers have been supplied by F. J. Obert, of the Union Boiler Works, Reading, who is also raising the stack.

Spearman Furnace was blown out on the 16 h inst Some repairs are contemplated, and this was thought a good time to make them, as considerable difficulty is experienced in getting coke, on account of the scarcity of cars and the blockade on the railroads, which are overburdened with freight.

The Glendower Rolling Mill has started up again.

It is said that the Greenville Rolling Mill is to be enlarged, and that by the 1st of January next it will give employment to 75 more men.

The production of iron last week at Topton Furnace was 237 tons, including 10 tons of castings. This furnace has been doing remarkably well under its present management, and is in first-class order. A considerable portion of the iron ore used is mined almost within a stone's throw of the furnace, and for convenience of location and facilities for business, the furnace is unsurpassed by any in this section of the State. The firm of William M. Kaufmann & Co., operating this furnace, are also interested in several valuable iron mines in the vicinity of Topton.

The Webb Tool Company, a new organization of Pittsburgh capitalists, have opened an office in the Cutlery Building, at Beaver Falls, where they will manufacture a new line of tools, upon which patents have been obtained. It is said to be a good invention.

The Blandon Rolling Mill is now crowded with orders, and the employees are compelled to work day and night. There are over 140 hands employed.

Messrs. P. L. & L. E. Weimer have become the sole proprietors of the Weimer Machine Works, the most flourishing works of the kind probably in the country. They have purchased a lot adjoining their works on which they will erect an office 28 x 80 feet.

The Chester Rolling Mill, in South Chester, is now running night and day on plate iron, 450 hands being employed. The owners of this mill have their new furnace near the mill ready to blow, and it is expected to make about 100 tons of pig iron daily. This furnace is said to be one of the most complete in the country, as every approved improvement known has been introduced. Adjoining the furnace will be the

new steel works, now being built, and expected to be in operation early in the coming year. There will be two open-hearth furnaces, each 30 tons capacity. The company owning these works have 15 acres of ground, now nearly covered with buildings. Being near the Delaware, a wharf extending out nearly 400 feet has been constructed for the landing of the ores to be used in the furnace. Adjoining may be found the works of the Chester Pipe and Tube Company, now manufacturing about 20 tons of pipe daily.

The personal property of the Allentown Rolling Mill Company, advertised to be sold by the sheriff on Monday to satisfy the judgment of Ario Pardee & Co., was purchased by Mr. Comly, of Philadelphia, for the plaintiffs, Ario Pardee & Co., at $24,542. Additional personal property, such as ore mine leases, machinery and horses and carts, &c., will be sold in a few days.

Some two weeks ago Mr. I. P. McIntyre purchased the Mount Pleasant Foundry property for the purpose of turning it into a mill for the manufacture of foundry facings. He is now almost ready to start up.

PITTSBURGH AND VICINITY.

Doyle & Co., glass manufacturers, are running full time and turning out some fine wares. Their new furnace is doing remarkably well.

The Pittsburgh Car Wheel Mfg. Co., on Preble avenue, Allegheny, have built a large addition to their already large establishment, and are now engaged in the construction of freight cars.

Thomas Evans & Co., glass manufacturers, are working full time at their new factery on Eighteenth street. Their new furnace is a great success, and although they are turning out great quantities of chimneys, they could ship as many more if they had them. As their producing capacity is very great, however, they are keeping up with their orders pretty well, all things considered.

The Pittsburgh Hinge Factory is running overtime.

The extensive works and offices of the Westinghouse Air Brake Co., on Lacock street, Allegheny, which have been in course of erection for over a year, are about completed, and rank among the most extensive and complete establishments in this locality. The buildings are four and five stories high, and occupy a space of 46,020 square feet. About 360 hands are employed.

WEST VIRGINIA.

The Moundsville Rolling Mill has received a new engine from Thompson & Hibbard, of Wheeling, which will be used for pumping water. The rolling mill is now running double turn.

The blast furnace of the Riverside Iron Works, Wheeling, has been doing some very good work lately. The product for one week, ending at 6 a. m., Nov. 6, was as follows:

		Tons.	Pounds.
Oct.	30	113	1070
"	31	115	1550
Nov.	1	113	520
"	2	121	1730
"	3	121	190
"	4	121	780
"	5	122	1450

Or a total of 829 570-2240 tons.

The Riverside is 16½ feet drain of bosh by 75 feet high and furnished with four Player iron pipe hot-blast stoves. The above product was not made by excessive driving and large consumption of fuel, but was done with an average consumption of 62.47 bushels of coke per ton of product. The managers hope to raise the output to 900 tons per week before the end of the season.

OHIO.

The following papers were filed last week with the Ohio Secretary of State at Columbus: The Cleveland Rolling Mill Railway Co., of Cleveland; capital stock, $500,000, in shares of $100 each, by J. H. Wade, H. B. Payne, Wm. Chisholm, S. T. Everett and S. H. Chisholm. The Export Manufacturing Co., of Cleveland; capital stock, $500,000, in shares of $100 each, by W. J. McKinney, Thomas Axworthy, J. H. Palmer, W. B. Sanders, C. D. Robinson and Wm. B. Sands.

The Lima Car Company has just been organized at Lima, with a capital of $250,000, to engage in the exclusive manufacure of freight cars. The president of the company is Mr. C. S. Brice, who is also vice-president of the New York, Chicago & St. Louis Railway Co. The works will occupy 14 acres of ground and will consist of six large buildings.

The Lake Shore Foundry is filling an order for 1000 tons of pipe.

Hecla Furnace started again last Monday and is making her usual output of standard car-wheel metal. They have less iron on the wharf than at any time during the blast.

The Lima Machine Co., Lima, are engaging in the manufacture of light locomotives and car wheels, and we are informed propose to make a specialty of this sort of work. Their establishment is very extensive and very complete.

William Tod & Co. are to-day shipping two large presses, weighing 10 tons each, to the Colorado Steel and Iron Company, of Pueblo, Col. The firm have a large order to fill for the Colorado Company.—*Youngstown Register.*

MICHIGAN.

The following table exhibits, in gross tons, the total lake shipments of iron ore the present season, up to and including November 9, together with the amount shipped during the corresponding period last year:

Where from.	1880.	1881.
Escanaba	1,120,742	1,383,855
Marquette	633,294	673,403
L'Anse	53,000	53,061
Total	1,807,042	2,110,319

An increase of 303,277 gross tons.—*Marquette Mining Journal.*

KENTUCKY.

Everything at the Norton Iron Works has been in good working condition during the past week. The furnace has averaged over 50 tons per day, and the nail factory has turned out 6750 kegs of nails; 7500 kegs of nails and 445 tons of iron have been shipped during the week to Cincinnati.

Ashland Furnace during the week has been working satisfactorily, having made in 6½ days 413 tons of No. 1 iron, using only raw coal as fuel. This is an average of over 63 tons per day.

MISSOURI.

Mention has been made in the papers from time to time for several months past of a consolidation of some of the most important business interests in this section of the country, but until this week the matter has never assumed a tangible and permanent form. The original efforts looked to the combination of Iron Mountain Company, who operate the iron deposits of the Iron Mountain in this State; the Chouteau, Harrison and Valle Company, who own and operate the Laclede Rolling Mills, in this city; the Vulcan Steel Company, who own and operate the Vulcan Steel Works, and who lease and operate the Jupiter Blast Furnace, in this city; the Pilot Knob Iron Company, who own and operate the iron ore deposits of the Pilot Knob Mountain, in this State, and the Grand Tower Mining and Transportation Company. Owing to some differences of opinion on vital points the matter became narrowed down until the consolidating companies consist of the Vulcan Steel Company, the Pilot Knob Company and the Grand Tower Company, the principal object being the manufacture of steel rails. The Pilot Knob Company will furnish the ore, the Grand Tower the fuel, and the smelting, converting, rolling, &c., will be done at the Vulcan Works. The name of the new company into which the three named have merged their individuality is the St. Louis Steel and Ore Company, and its capital is placed at $5,000,000. Mr. Ethan Allen Hitchcock, of this city, has been elected president, and Mr. Thomas Dickson, of New York, president of the Delaware and Hudson Canal Company, vice-president. The syndicate of Eastern capitalists who have invested in the enterprise are Jay Gould, Commodore Garrison, Thomas Dickson, Russell Sage, Cyrus W. Field, Solon Humphreys, Le Grand B. Cannon, H. G. Marquand, F. L. Ames, J. A. Burden, A. A. Lowe and David Dows. What is known as the Garrison interest held control of the majority of the stock of the Vulcan Company, and in manipulating the matter nearly all of this stock passed into the hands of the new buyers; Mr. Oliver Garrison, who was president, and Messrs. D. R. Garrison, D. E. Garrison and O. A. Hart, who were directors, resigning their respective positions. The directors of the new company are E. A. Hitchcock, C. S. Greeley, T. E. Tutt, J. H. Maxon, Edward Walsh, Jr., C. P. Chouteau and D. K. Ferguson, who reside in St. Louis; and Jay Gould, Thomas Dickson, Commodore Garrison, Solon Humphreys, H. G. Marquand and Le G. B. Cannon, in New York. President Hitchcock is well known as one of St. Louis' most active business men, and controls immense amounts of capital. The outlook for the new concern is very bright indeed, there being accepted orders already on the books of the Vulcan Company covering probably 60,000 or 70,000 tons of steel rails. Owning exhaustless deposits of rich ore, exactly suited to their business, exhaustless deposits of fuel and a plant now in full and successful operation, and capable of turning out 350 tons of finished steel rails a day, and backed by a syndicate of stockholders who control probably 14,000 or 15,000 miles of railroads, the St. Louis Steel and Ore Company evidently have a prosperous future before them.—*St. Louis Age of Steel.*

The new Corliss engine, built by the Smith, Beggs & Ranken Machine Co., to replace the one recently destroyed at the car works of the Missouri Car and Foundry Co., has been placed in position, all connections made and everything is again in lively working order. The works are being provided with a large number of electric lights, the better to enable the operatives there to work at night.

Of the 291 axles which failed on English railways the first half of this year, 149 were engine axles, viz.: 138 crank or driving and 11 leading or trailing; 23 were tender axles, 109 were wagon axles, and 10 were axles of salt vans. Of the 138 crank or driving axles, 87 were made of iron and 51 of steel. The average mileage of 80 iron axles was 181,988 miles, and of 47 steel axles 172,328 miles. Of the 381 rails which broke, 307 were double-headed, 71 were single-headed, 1 was of the bridge pattern and 2 were of the Vignoles' section; of the double-headed rails, 221 had been turned; 221 rails were made of iron and 160 of steel. Of the 780 tires which failed on the railways of the United Kingdom during the six months ending June 30 last, 47 were engine tires, 35 were tender tires, 5 were carriage tires, 35 were van tires, and 670 were wagon tires; of the wagons, 551 belonged to owners other than the railway companies; 581 tires were made of iron and 109 of steel; 28 of the tires were fastened to their wheels by Gibson's patent method, 18 by Beattie's patent, 10 by Mansell's patent, and 27 by Drummond's patent, all of which remained on their wheels when they failed; 682 tires were fastened to their wheels by bolts or rivets, of which 5 left their wheels when they failed, and 15 tires were secured to their wheels by various other methods, none of which left their wheels; 100 tires broke at rivet holes, 195 in the solid, 2 at the weld, and 474 split longitudinally or bulged.

Mechanical Imitation of Electric and Magnetic Actions.—Chase's apparatus for imitating "lines of force" and showing a mechanical control of magnetic currents, has furnished a precedent for many similar contrivances. One of the latest is that of M. C. A. Bjerknes, for the hydrodynamic imitation of electric and magnetic actions. The inventor proposes to use his apparatus not only for the investigation of known laws, but also for the discovery of laws and methods which have been hitherto unknown. He has been for some time occupied upon the study of oscillations of various kinds. His attention appears to have been turned in this direction by the acoustic attractions and repulsions which were experimentally examined by Guyot, Schellbach and Guthrie, and which have been partially studied mathematically by Sir Wm. Thomson.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, November 24, 1881.

DAVID WILLIAMS - - *Publisher and Proprietor.*
JAMES C. BAYLES - - - *Editor.*
OHN S. KING - - - - - *Business Manager.*

RATES OF SUBSCRIPTION

INCLUDING POSTAGE.

THE UNITED STATES, BRITISH AMERICA AND SANDWICH ISLANDS.

Weekly Edition.....$4.50 a year.
Issued every THURSDAY morning.
Semi-Monthly Edition.....$2.30 a year.
Issued the FIRST and THIRD THURSDAY of every month
Monthly Edition.....$1.15 a year.
Issued the FIRST THURSDAY of every month.

TO ALL OTHER COUNTRIES.

PER ANNUM. POSTPAID.

Weekly Edition: $4.00—£1—25 francs—20 marks—12 florins—6 roubles (coin)—25 lire—20 pesetas.
Semi-Monthly Edition: $2.50—10/—12½ francs—10 marks—6 florins—3 roubles coin)—12½ lire—10 pesetas.
Monthly Edition: $1.25—5/—6¼ francs—5 marks—3 florins—1½ roubles (coin)—6¼ lire—5 pesetos.

REMITTANCES

should be made by draft, payable tothe order of David Williams, on any banking house in the United States or Europe; or, when a draft cannot be obtained, in postage stamps of any country.

NEWSDEALERS OR BOOKSELLERS

in any part of the world may obtain *The Iron Age* through the American News Company, New York, U. S. A.; the Wilmer & Rogers News Company, New York, U. S. A., and London, England; or the San Francisco News Co. San Francisco, California, U. S. A.

RATES OF ADVERTISING.

One square (12 lines, one inch), one insertion, $2.50; one month, $7.50; three months, $15.00; six months, $25.00; one year, $40.00; payable in advance.

DAVID WILLIAMS, Publisher,
83 Reade Street, New York.

PITTSBURGH.....77 Fourth Avenue
JOS. D. WEEKS, Manager and Associate Editor.
PHILADELPHIA.....220 South Fourth Street
THOS. HOBSON, Manager.
CHICAGO.....36 & 38 Clark st., cor. Lake
HENRY SMITH, Manager.
CINCINNATI.....Builders' Exchange
T. T. MOORE, Manager.
CHATTANOOGA.....Eighth and Market Streets
S. B. LOWE, Manager.

BRITISH AGENCY.

The publishers of *The Ironmonger*, 442 Cannon street, London ,England, will receive orders for subscriptions and advertisements on our regular terms.

CONTENTS.

Through the agency of elevators for freight and passengers, our large cities are undergoing a transformation in various ways. By enabling the inhabitants to live or do business in successive tiers, from the earth upward to a limit not yet precisely known, the population becomes much more dense within a given area, so that it is difficult at certain hours, as we see in some of the lower wards of this city, to find space in which vehicles and pedestrians can move about in the streets. Elevators, in fact, are a perpendicular extension of the common thoroughfare, and eventually must come under regulation by statutory provisions, the same as ferry-boats or railroads. At present there is too much of irresponsibility, both as regards construction and operation. It is not yet certain, for instance, in cases of gross negligence, whether the owner or the tenant of a building is liable, or the manufacturer of the apparatus. No one can feel any confidence that his life is safe while suspended at an unknown elevation between earth and heaven. In a single building in this city from 5000 to 7000 persons use the elevators daily, and in quite a number of stores and warehouses they are in constant use by crowds of people—the cages raising or lowering all they can hold at nearly every trip. If accidents were unknown, we could afford to rely upon the confident promises of makers, each of whom has some safety catch or guard in which he professes absolute faith. But accidents are frequent and fatal, and nearly every day adds a new one to the list of casualties from the fall of elevators. An enactment making the owner liable for the safety of elevators in his building, would probably meet the need better than any system of official inspection and licensing.

Steel Blooms.

A valued correspondent, referring to our editorial discussion in last week's issue of the late Treasury ruling relating to steel blooms, assures us that we are arguing from mistaken premises. He says: "The decision to find fault with is that of 1879, not "the last one. Steel blooms should bear a "duty of 2¼ cents, and if all steel blooms "should bear this duty, part of them certainly should. The last decision was right, "so far as it goes, and we should accept it "as such and try to get all blooms rated at "2¼ cents." Our correspondent misunderstands us. We did not attempt to discuss what should be the proper duty on steel blooms. If the law authorizes their appraisement at 2¼ cents per pound, good; if at 45 per cent., we are willing to accept it. The question of what the proper duty is was not raised in our editorial. But if the Treasury Department, after a hearing, decided—intelligently or otherwise—that 45 per cent. was the proper duty on steel blooms, Judge French has no right, two years later, to so limit the application of that decision as to make it relate only to one class or size of blooms, admitting them at 45 per cent., while blooms of other sizes, but in no other respect different, are charged 2¼ cents per pound. We consider this an arbitrary and outrageous abuse of official power. Had he said that the Treasury Department, after careful consideration, had decided that the 1879 decision was wrong, and that after a certain date, giving reasonable time for the completion of contracts already made, the duty exacted on steel blooms would be 2¼ cents, we should have said it indicated a much clearer conception of the meaning of the law than was shown in the 1879 decision. But this is not what was done. Judge French has permitted importers and consumers for two years to understand that the 1879 ruling was made in good faith, and the Treasury has accepted 45 per cent. duty as satisfactory on the blooms which are now arbitrarily changed into another and very different classification. If any blooms are entitled to come in under the 45 per cent. duty, all are; if no blooms are entitled to this low rate, there is no reason why the Treasury Department should rule that any are. That if all steel blooms should bear the 2¼-cent duty, part of them certainly should, is at best only half the truth, and calculated to mislead. If all should bear this duty, none should be held dutiable at a lesser rate; if the lesser rate applies to any, it applies to all. We opposed the decision of Judge French in classifying blooms under the 45 per cent. rate, and have yet to hear of any logical defense of that ruling. If he is prepared to reverse it he could not do better; but to half undo a wrong may make it a greater wrong than it was in the first instance, and this is what has happened. Why the importer of a 7-inch or a 6 by 7-inch 600-pound bloom should have an advantage of $36.90 per ton duty over the importer of a 3 by 5-inch bloom, weighing say 350 pounds, we cannot see. It is an injustice. When we consider it from the other standpoint, the fact that the importer of the lighter bloom is at a disadvantage as compared with the importer of the heavier bloom to the amount of $36.90 per ton duty, it becomes an outrage. This is our position exactly. We do not know, and we do not care, what influences were brought to bear upon Judge French to induce him to make this unjust discrimination. The fact that he has made it justifies our comments of last week, which we do not need to assure any one interested would have been very different had Judge French simply reversed the ruling of 1879, and declared that hereafter steel blooms would be held dutiable at 2¼¢.

Our correspondent further says: "The "importers are not so badly hurt as they "pretend, for provision has been made in "most contracts for just such a case as an "increase of duty. I suppose you are also "aware that this case came up on an appeal "of Clark, Post & Martin, claiming 30 per "cent., so the importers have only themselves to blame that an opportunity was "given for the decision." Here are two statements which may well be called surprising. It is not true that all contracts for the importation of steel blooms have been made with a clause providing against a possible increase of duty; if any have, it is an amusing comment on the Treasury Department's administration of the law. But whether the sufferers are many or few, and whether they are much or little hurt, counts for nothing. No man who does a legitimate business should have his ventures subject to the whims of the Treasury Department in changing or limiting, without notice, rulings accepted in good faith by government and people. Certainly it is no excuse for the Treasury Department that an opportunity was offered for such a reclassification of steel blooms by an appeal from an importing house for a lesser duty. This may have been an impertinence, but it is not the province of the Treasury to punish it by an act of injustice. The importers had a right to appeal; and to say that, because such an appeal was made, they have to thank themselves for Judge French's action, is to make a statement which should bring a hot flush to the cheeks of every American citizen who properly understands the position of a public servant in office. Who is Judge French that, because an importing house appeals from a duty demanded, he should put on the screws and make them and others in the same position pay the penalty of their presumption? To defend such an act is to aim a blow at the whole system of protection. Its enemies need want no better weapons with which to attack it.

The Foreign Iron Markets.

For the last three or four weeks the foreign iron and mining markets have been quiet in all departments. There are, however, no indications of weakness; on the contrary, late advances have been well maintained, and the present state of affairs must be attributed to other causes. So far, it must be admitted, the demand for iron has not assumed anything but ordinary dimensions, although a gradual improvement is expected in the heavy trades, and we shall not be surprised to witness even a sudden increase of activity. From our latest English correspondence the reader will have observed that business at Sheffield is steadily progressing, abundant orders being easily obtainable by the local steel works, foundries and forging mills. For many months during the period of depression work was exceedingly scarce, and many ironworkers were obliged to leave the neighborhood and seek employment elsewhere. Now, however, the increased activity in nearly all departments of the large works has considerably brightened the prospects of the workingman. The demand for Derbyshire pig is steadily increasing, and the Wingerworth Iron Company and Sheepbridge Coal and Iron Company are sending out large quantities at firmer prices. Bessemer billets find a readier sale, although the quotations are stiffer, and for best qualities of tool steel there is a growing inquiry. Makers of Bessemer are fully employed, and find it difficult to satisfy their customers, so numerous are the uses to which this kind of steel is applied. Notwithstanding the large output of Bessemer, makers of crucible are pleased to find their manufacture is no glut in the market, and there is, especially for crucible steel castings, a very good market. In the light branches the improvement is almost equally gratifying. Saws, edge tools, and files are going off well, and the cutlery houses are doing a capital trade, more particularly for best descriptions of table cutlery and pocket knives. The Glasgow pig iron market opened quiet at the beginning of the month, but soon became firm, and prices ran up to the extent of 4d. per ton. Makers' iron was rather slow in demand, and parcels changed hands at prices considerably below the official quotations. The shipments for the season were fair, but, on the whole, the export demand for all countries was on a rather restricted scale. On the other hand, the home trade continued excellent in all its various branches. Liverpool indications show that business is on a sound and steady basis, and though prices do not advance much, there can hardly be any relapse in them, except where a few weak speculators throw themselves on the market. Cumberland reports state that, despite the success of the basic method of producing steel, there is a very large extension of the hematite iron trade, late improvements being fully maintained. Out of 81 furnaces erected from Carnforth along the coast by Barrow to Maryport, there are 60 blowing, and it is believed that others are being prepared to be blown in. Despite the fact that the Spanish ore delivered in Cumberland is higher in price than that from the local mines, there is a considerable importation, and this shows the largeness of the demand. In the Northeast there is a growing production of iron from imported ores, chiefly Spanish or Elban, and when the cheapness of delivery and of fuel is borne in mind, it will be seen that the growth has a solid foundation. In South Wales the manufacture, under similar conditions, is growing, and in Scotland, where it has been more recently introduced, it is also showing signs of vigor. Unquestionably this is in part due to the large demand for steel rails; but it is also contributed to by the fact that there is a growing use for Bessemer steel for purposes daily widening, and in some of which it infringes on the field that had been occupied once exclusively by steel made by some of the older processes; and as with this enlarged production there is greater cheapness—partly because there are improvements and economies in the process, and partly because of the increased competition among the makers—it is to be expected that the area of use will continue to be widened, and that, though the demand that has recently arisen for steel rails may not continue, the widening use will give to the producers a full field for the disposal of the produce of their converters.

How far the English demand for foreign ores may be interfered with by the adoption of the basic process cannot yet be determined, but the figures and facts produced at the recent meeting of the Iron and Steel Institute seem to point to the growth of the process. The initial difficulties have taken much time to overcome; but as the process extends there will also be an attempt to not only improve it but also to cheapen it; and it will be when this is attempted that the competition will arise between Bessemer and basic metal. Meantime, the production of hematite increases, and it is likely still further to increase in the immediate future.

In Northamptonshire the steady improvement in the price of pigs appears now to be a well established fact. At the present time but little is being done, the majority of ironmasters having sold their make at good remunerative prices up to the end of the year, and in some instances beyond, at higher prices than those for immediate delivery. The general impression is that present prices will continue for some months. What may be the result of more furnaces being started in the district and in the adjoining counties, no one can conjecture, particularly as at no far distant day the arrangement now in force for a reduction of 12½ per cent. on the make of common iron in the North will expire. These circumstances combined may prevent further advance, which may be an advantage to the general trade of the country, past experience having taught that very high prices in the long run are not profitable. Ores continue in moderate request at the old price—which is low, and must continue so, except more furnaces are blown in than are now anticipated. The Lancashire iron market remains dull, with very little inquiry, and there is a disposition on the part of second-hand holders to take less money, but makers are still firm, and the actual trade of the district continues in a healthy condition. A considerable proportion of the work is on foreign account, and this is of a very varied description, including orders from France and the Continent generally, China, the Colonies, and the United States, the number of American inquiries having been quite a noticeable feature of late. Reports from other parts of England agree very nearly in regard to steady prices and general quietness of the markets.

In Germany the condition of the iron markets is good; nearly all the products show a more or less marked increase in value, and the influx of new orders will lead to a further advance in rates. Statistics have been issued relative to the production of the Dortmund district, from which it would appear that 219,300 tons of pig iron were made in the third quarter of this year, as compared with 220,000 in the first quarter of 1881, and 205,000 tons during the third quarter of 1880. As regards finished iron, 122,800 tons were made last quarter, against 118,000 tons in 1880, or an increase of 4800 tons. The output of steel was 219,000 tons, against 167,000 tons, or 52,000 tons increase on last year. All the steel works are fully occupied. The Gutehoffnung, of Oberhausen, has obtained an order for 10,000 tons of blooms for the United States. At Breslau the Rhine Steel Works, of Ruhrort, have divided with Hoerde and M. Fred Beyersmann, of Hagen, a lot of 2000 tons of rails at £7. 8/ per ton, while the Gutehoffnung obtained the order for 217 tons of fish plates at £6. 14/. The Phœnix Company and the Union at Dortmund have received an order for 1630 tons of hoops at Strasburg. At Utrecht, an order for 5000 tons of rails has been given to the Rhine Steel Works at Ruhrort, and 350 tons of fish plates to M. Dopplet, of Maestricht. At Hanover, M. Gossens, of Aix, has taken a considerable order for wagons. The Vulcan Company, at Stettin, has secured an order for 32 locomotives and tenders for the Upper Italian Railway Company. At Dortmund, great animation is reported in the iron trade, and bars have been advanced, being now offered at £6. 5/ to £6. 8/. Joists have risen 3/ to 5/ per ton, though the demand is rather less active on account of the late period of the year. Plates and wire are in excellent request, and the deliveries thereof are very good.

In France recent improvements continue, and a further rise in prices is firmly maintained. *Le Fer* reports that the dominant tone in the French iron markets is one of firmness. The works are fully occupied, and proprietors have no difficulty in selling at present prices. The demand for plates is very strong, both for the shipyards and the boiler makers. The shipyards have been steadily extended lately, and there is also a good request for bolts and rivets used thereat. Chains are in equally good demand, these being required for the numerous new steamers which have been bought since the vote was passed for the payment of a bounty. In the Ardennes the demand is so good that prices have been advanced to 185 francs for merchant iron. The nail works are well employed, but the hand-made nails are rapidly being abandoned for the machine-made article. The demand for railway materials is very strong. The new companies—A. Genot, at Nouzon, and Charles Brezol & Co., at Charleville—have secured full complements of orders. It is announced that the Terrenoire Company are about to erect a new blast furnace for ferromanganese at their Bességes works, and it will be very well situated there, for nearly all the the manganese ores come by way of the Mediterranean.

The market for Belgian iron has fully maintained its firmness, and the demand, especially for bars and nail rods, has been in no way abated. All the manufacturers are fully supplied with contracts, and the orders, instead of diminishing, appear to be increasing. The exports are of larger extent. The prices are lower than they should be, looking at the demand, but producers are accepting little new work. One of the principal of the Charleroi manufacturers has had offers of 5000 tons during the past month, but has only accepted an order for 500 tons. Pig iron has already commenced to advance, and at Charleroi 60 francs to 62 francs has to be paid for best qualities, and 55 francs for ordinary qualities. Merchant iron is 130 francs; joists, 150 francs; and angles, 155 francs. As regards coal, the output in 1830 was 1,913,670 tons, while in 1880 it was 4,448,531 tons.

In Austria an agitation is being carried on to have the duty on pig iron raised, and there is a probability of this concession to native industry being granted by the Government. Lately the great iron producers, who are raising a cry for higher duty, have been supported by the proprietors of coal mines, who hope that the price of their product—coke—will rise at the same time as the price of pig iron. These mines are almost all in the hands of firms like Guttmann, Rothschild and others, who can afford to risk an interruption in the regular sale of their produce. The coal mines in Austria are all situated at a great distance from the iron works, and the coke must be transported a long way by rail. For this reason the price of coke is somewhat higher than it is in Westphalia, but not as high as it is at Saarbrücken. The manufacturers of pig iron make use of the high price of coke as a pretense for demanding a higher duty on pig iron. But it is known that the producers of coke and pig iron are very good friends; in some instances they are the same person, and making a "corner." If they plead for a higher duty, therefore, it is but in the hope of obtaining thereby a higher price for both iron and coke.

We hear very little from Russia, and can only report the recent discovery of extensive coal beds which, according to all appearances, promise a liberal supply for a number of years. In Turkey the demand for iron is still continuing, the coal market, however, being reported dull and languid. The same may be said in regard to Egypt, these results being the natural consequences of large arrivals and limited inquiry.

The Trades Union Congress.

The International Trades Union Congress assembled in Turner Hall, Pittsburgh, on Tuesday, the 15th. The attendance was fair, although not nearly so large as was expected. In all there were thirty-one delegates present, among whom were representatives of the Typographical Unions of Chicago and New York, the International Cigar Makers' Union, the Window Glass Workers' Association of the United States and the Amalgamated Association of Iron and Steel Workers. The aggregate membership of all unions represented was 215,634. No very important business was transacted on the first day of the meeting, the principal events being the election of Mr. John Jarrett, President of the A. A. of I. & S. W., as temporary chairman, the appointment of a committee on credentials and the delivery of several addresses by delegates. Mr. S. Gompers, of the International Cigar Makers' Union, gave some interesting facts in regard to the organization and working of his league. This union has a committee similar to that of the A. A. of I. & S. W., which has power to order or forbid strikes.

On the second day, Wednesday, a permanent organization was effected by the election of Mr. Jarrett as president. A committee was appointed to draw up a platform, to contain a formal enunciation of the principles of the congress, and several resolutions were offered, among them the following, which elicited great applause:

Resolved, That this Congress demand the repeal of the law known as the conspiracy act, as far as it relates to labor organizations to regulate their own wages.

Resolutions were also passed condemnatory of convict labor, demanding its abolition and refusing political support to any candidates who approve of it. On the third day the Committee on Permanent Organization reported a scheme, which we give:

This association shall be known as the Federation of Organized Trades Unions and Labor Organizations of the United States of America and Canada, and shall consist of such trade and labor organizations as shall, after being duly admitted, conform to its rules and regulations, and pay all contributions required to carry out the objects of this federation. The objects of this federation shall be the encouragement and formation of trade and labor unions; the encouragement and formation of trade and labor assemblies and councils; the edcouragement and formation of national and international trade and labor unions; to secure legislation favorable to the interests of the industrial classes. The third session of this federation shall be held annually on the third Tuesday in November, at such places as the delegates have selected at the preceding Congress.

Then follow provisions for representation and further organization. Resolutions of

sympathy to Ireland were passed, and the Committee on Platform then reported. After a preamble setting forth the right of labor to organize, and the benefits to be derived from a labor congress, there were a number of resolutions asking for laws allowing the incorporation of trade unions, and forbidding the employment of children under 14 years of age in factories, &c.; the enforcement of the eight hour law; the abandonment of contract convict labor; the abolishment of truck or store order pay for work; the passage of a law making a workman's claim for wages first lien on a building; repeal of the conspiracy laws; formation of a national bureau of labor statistics; that railroad land grants, forfeited by reason of non-fulfillment of contract, should be immediately reclaimed by the Government, and henceforth the public domain reserved exclusively as homes for actual settlers; that Congress should adopt such laws as shall give to every American industry full protection from the cheap labor of other countries; the passage of a law by the United States to prevent the importation of foreign labor under contract; a recommendation to all trades and labor organizations to secure proper representation in all law-making bodies by means of the ballot, and to use all honorable measures by which this result can be accomplished. All this was carried, although the passing of the tariff resolution involved much discussion.

On Friday, the fourth and last day, resolutions were passed recommending the entire prohibition of Chinese immigration, the prohibition of manufacture of cigars in tenement houses, and several rules regarding the routine business of the convention. At the afternoon session the following resolutions were passed:

Resolved, That we demand strict laws for the inspection and ventilation of mines, factories and workshops, and sanitary supervision of all food and dwellings.

Resolved, That strict laws be enacted making employers liable for all accidents resulting from their negligence or incompetence to the injury of their employees.

The Congress then adjourned finally, after agreeing to meet at Cleveland on the third Tuesday of November, 1882.

Fire Protection of Mills.

Losses by fire, no matter how we may regard them, are so much deducted from the wealth of the country. They represent so much labor wasted, and though the individual may obtain the amount of his insurance from a company, there has been a loss to the country's resources equal to or exceeding that amount. Most men realize this, and our manufacturing readers more than any other class. At the recent meeting of the American Society of Mechanical Engineers in New York, Mr. C. J. H. Woodbury, of Boston, read a paper upon the fire protection of mills which was full of the most valuable instruction for the manufacturer. In another part of this issue we give extracts from the paper, and present many of the cuts by which it was illustrated. Though largely intended for cotton mill practice, the principles laid down, the suggestions made and the directions given are those which must of necessity be applicable to buildings of any class in which manufacturing is going on. The space devoted to the fire organization of mill operatives should be read by every one who has a factory. They are full of what our Western friends so pertinently call "horse sense." They appeal at once to the practical man. No one who operates a manufacturing establishment of any kind should fail to read the article attentively, and, having read it, at once attend to its suggestions.

Few mills can be named that do not have a considerable fire apparatus, except, perhaps, those in our large cities, where dependence is placed upon the paid departments; yet in how many of these mills could a stream of water, or a pailful even, be got upon a given point within a reasonable time if an alarm of fire should be given. If a superintendent wishes to experiment with the workings of his fire department, let him light a few bunches of cotton waste in an ash-can in some corner of the mill, cry fire, and await the result. He will soon find out who are the cool-headed men, and he will also find out whether there is any value in his system. Excitement on the part of the watchman, when trying to start the pump at night, may be the cause of losing the use of the pump. Ignorance or forgetfulness as to the position of the fire extinguishers, may make an insignificant fire assume large proportions.

The suggestions made by Mr. Woodbury in regard to fire doors are very valuable, and in all cases where there are iron doors of this kind they should be at once replaced by incased wood. The cost of the latter form of doors is very little, and their value is so much greater that no comparison can be made between the two. The subject of automatic sprinklers is one which will be a novelty to many of our readers. Their value, however, has been well tested. There are many mills, other than cotton or woolen factories, where they can be adopted to advantage, as, for example, in dry rooms, varnish and oil rooms, elevator shafts, points where hot flues approach woodwork, &c. There is no small satisfaction in knowing that within 20 or 25 seconds from the time a fire starts these sprinklers will be throwing a stream of water upon the flames. A judicious use of such appliances would doubtless greatly decrease the amount of premium asked upon any ordinary factory building. Little consideration is needed to show how greatly the risk is reduced by an automatic apparatus of this kind, which begins to discharge water upon a fire as soon as the heat has reached a certain degree, without the necessity of any outside attention. The advantages of such an apparatus are so obvious, and the field for application so great, that we shall be surprised if the automatic sprinkler is not found before long in almost every shop and store. We shall watch with much interest for the publication of Mr. Woodbury's book, now in press, by John Wiley & Sons, publishers, to whom we are indebted for advance sheets, in which he will treat at some length many subjects that we have not space to mention.

The financial strength and restless enterprise of our leading capitalists are strikingly shown by the noiseless progress which is making in the construction of new trunk lines of railway between the Atlantic seaboard and Chicago. There are no less than six of these, to be completed within the next two years, at an expenditure of something like $65,000,000, most of which has already been secured by private subscription. It is not unlikely that the so-called "railroad wars" have been instigated to some extent by a desire to discourage the prosecution of these works. If so they have failed. Three of the lines referred to will have their terminus at Jersey City, viz.: The New York, West Shore and Buffalo, ending near the tunnel at Weehawken, with branches from Athens and Cornwall; the New York, Lackawanna and Western, and the New York, Pittsburgh and Chicago, the last mentioned including the Central New Jersey and its connections in Pennsylvania. In addition we have the New York, Chicago and St. Louis, the Chicago and Atlantic, and the Boston, Hoosac Tunnel and Western, all of which are being made complete by supplying intermediate sections or missing links. If we bear in mind the embarrassments of the past few months, arising from inadequate means of transportation—the "freight blockade" and the chronic complaint of a lack of cars—it will be seen that the capitalists who are now seeking profitable investment, as above described, have moved none too soon.

The expressed determination of the Mayor of Cincinnati to strictly enforce the law requiring commercial travelers to license before doing business in that city, is not likely to cause as much trouble as was intended or expected. In fact, the courts have sat upon this intended crusade very effectually. In the case of the city of Cincinnati *vs.* E. W. Barnes, charged with selling goods by sample without a license, Judge Higley rendered a decision dismissing it. The defendant is an agent for the sale of wringers, who solicits orders at private residences with a sample machine. The opinion of the Court recites all the several ordinances that have been in force and repealed, and concludes that the only one now in force is that of 1845, which simply provides for licensing hawkers and peddlers, and for penalties against those selling without license. This ordinance evidently has no application whatever to those who solicit trade by sample. Therefore the solicitation of trade by commercial travelers within the city may be prosecuted without any license or other limitation. No doubt the Mayor is sorry, but even so great a man as the Mayor of Cincinnati must respect the law as the courts interpret it.

The *Quarterly Review* (England) has found out that the earth is a vast secondary battery that only needs tapping in a certain way—which is left for the Society of Telegraph Engineers to find out—to get an unlimited supply of electricity for lighting and other purposes. To tap it in some way would do good, for the *Quarterly* refers to this stored-up electricity as the cause of all earthquakes, Mallet, De Beaumont, Scropes, Lyell, Hopkins, Hilgard and others notwithstanding.

The Erie Basin Dry Docks, leased by Wm. Cramp & Sons, and equipped with machinery for handling the largest vessels, are nearly finished. One section will be ready for business about November 20, and the second section about January 1. These docks are located at South Brooklyn, and will afford means for the repair of crippled ocean steamers, long needed at this port.

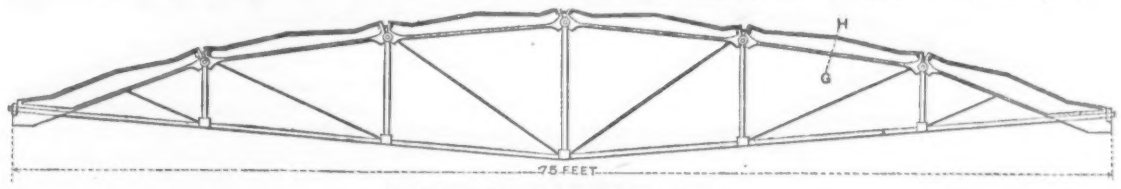
There arrived in Canada last September 8203 emigrants, but nearly two-thirds of them came across the border into the United States and settled here. The Canadians complain greatly of this constant drain of population, but it goes on all the same.

According to the St. Catharine's *Journal*, the machinery of the Welland Canal locks is so complicated that vessels are not considered safe in passing through, except under direction of an experienced engineer. Those "locks" must be fearfully and wonderfully made.

The Duryea blow-pipe furnace, for the production of wrought iron directly from the ore by the use of petroleum fuel, is, it is stated, making a success at the experimental works in Toledo, Ohio. It is said that an average of 40 gallons of petroleum makes one ton of wrought iron.

New Form of Cast Iron Girder.

Mr. P. H. Jackson, of San Francisco, Cal., has recently invented a form of cast-iron girder which appears to be worthy of the most careful consideration by engineers and builders. Recently tests of these girders were made at the Pacific Rolling Mills, and very remarkable and interesting results obtained. In a late number of the *Mining and Scientific Press* full particulars of these tests were given. We reproduce from that paper the engravings of the new girder in various forms. The object in the construction was, of course, to utilize the tensile strength of the wrought iron and the crushing resistance of cast iron. To avoid certain difficulties always encountered in the use of



New Form of Cast Iron Girder.—Fig. 1.

cast and wrought iron in the same structure, the compression member is made in sections, which are enumerated by means of cylindrical bearing surfaces. The use of several pieces in the cast-iron member reduces the difficulty of casting, especially when the pieces are large, and at the same time reduces the dangers which may arise from unequal strain during cooling.

Figure 1 represents a girder of 75 feet span. It gives a general idea of the form given to cast-iron portions, as well as the proportions of the different parts. The sections are connected by a knuckle joint, shown in detail in Fig. 2. In this case the ends of the arch are made with sockets, and the head or top of the strut is cylindrical. As the bottom portions of the ends of the arch inclose the head of the strut, as at B, the arch itself cannot rise when unequally loaded, as it would be inclined to do under some circumstances. Fig. 3 shows a side view of a strut, or rather a view in the direction of the length of the girder. Its width is increased to give lateral stability. Sections of the tie-rods, three in number, are shown at the bottom. Fig. 4 shows another form of strut, together with a section of the cast-iron portion of the girder. It is a section at A B of the girder shown in Fig. 8. The lower flange, it will be noticed,

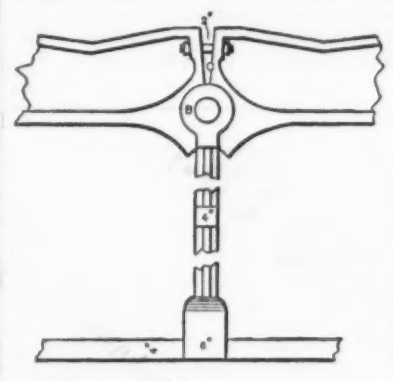


Fig. 2.

is 15 inches wide, while the web is but 1⅛ inches deep, and the upper flange only 3½ inches wide, barely enough to impart stiffness to the short member. Fig. 5 shows an end view of a girder, and Figs. 6 and 7 two forms of the knuckle joint. That in Fig. 7 is the same that was employed in an experimental girder recently tested in San Francisco. This (see Fig. 8) girder had a span of some 23 feet, and was tested very severely. In putting it together sheet lead was placed in the joints, to give a good bearing and obviate the necessity of finishing them. The *Mining and Scientific Press* gives the following account of the girder and the tests just mentioned:

Length, 25 feet; distance between supports, 23 feet 2 inches; hight from bottom of tie to under side of arch, 2 feet 3 inches. The cross section of arch (see Fig. 4) was 61 inches wide by 1½ inches thick at bottom, and the greatest hight 10 inches. Two of 2½ inch diameter wrought-iron tie-rods sustained the tensile strain. Fig. 7 shows the knuckle joint, the round cast on the center piece, and the socket cast on end pieces, and with the strut cast on same piece, this latter resting on the bottom on the tie-rods. Fig. 5 shows end of girder. At the top of the arch will be seen a space of 1¼ inches. Whatever may be the deflection, no parts of the arch, excepting the knuckle joint, touch,

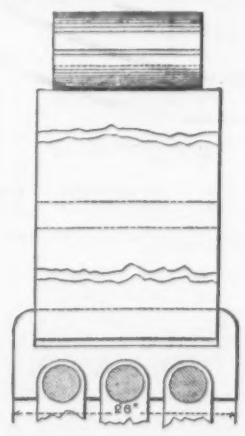


Fig. 3.

so that compression is only exerted on the line of the bottom flange. The cross-section of arch (see Fig. 4), is of the Hodgkinson form for straight girder and made to sustain a 16-inch brick wall; consequently, from its broad bearing for the wall, it is largely in excess in comparative resistance to the tensile capacity of the rods. The following is the cost of this girder in San Francisco, where materials and labor are higher than in the Eastern cities:

Weight of arch casting, 3080 pounds, at 3½ cents	$100.10
Weight of tie-rods and nuts, 902 pounds, at 4½ cents	40.59
Fitting four bolts and lead	5.50
Drayage and painting	3.00
Total	$149.19

Had this been made to sustain 186 tons as a safe load, the breaking load three times greater—the same casting to be used, but to have three of 3-inch diameter rods—it would have cost:

3080 pounds casting, as before	$100.10
Three 3-inch rods, 1848 pounds at 4¼ cents	87.78
Other expenses	9.50
Total	$197.38
Difference	$48.19

In the experiment at the Pacific Rolling Mills the other day, this girder was loaded with 117 tons and 1741 pounds of railroad iron for the length between the supports. Under the weight it deflected at the joints a quarter of an inch below the true arc. The foundation on which the girder rested set-

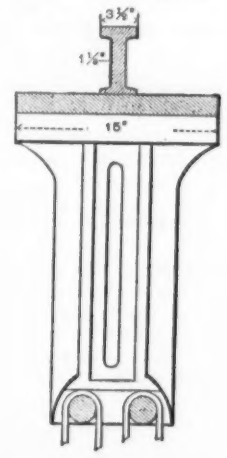


Fig. 4.

tled 7 inches, so that loading had to be stopped. It was supposed that the girder was capable of carrying 225 tons, at about which weight the tie-rods would break.

"At each of the abutting ends a sheet of lead was used to fill in between the castings, which were not nicely fitted, as the strength at this place was so much in excess of requirements. This was to make up for the irregular surfaces, the draft of the pattern making it fuller in the middle in each piece. To make up for the closing up part of the load, when the compressive force was exerted, as well as to straighten the tie-rods, when loaded, the arch was cambered ¼ inch at the joints above the true arc."

The modifications of the principle and the ingenuity in carrying them out are worth a careful study. The details, which are of great interest, are not so clearly shown in

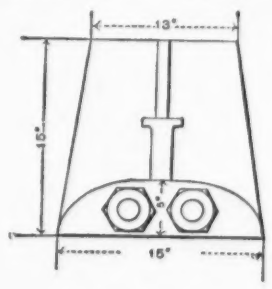


Fig. 5.

the drawings from which we copy as we could wish, but those which are shown are well worked out.

Gas Engines at the Frankfort Opera House.

In order to guard the Opera House at Frankfort from all danger of fire, there have been established in the basement of a neighboring building two pumps, capable of raising 66,000 gallons of water per hour to a hight of 60 feet. The motive power for these is furnished by two Otto gas engines of 50 horse-power each, placed beside the pumps and driving them by means of a shaft with friction gearing, which permits the working of one or both engines at a time. During performances in the house, one of these motors is kept slowly running out of gear, so that on the first alarm being given, a very few seconds only need elapse before all the machinery is in action. The consumption of gas for both engines when in full work is about 2540 cubic feet per hour; when out of gear it is only about 175 cubic feet per hour for one engine. The gas service pipe is 6 inches in diameter, reduced to 4½ inches after branching off to the first engine. There is no special meter employed for this service, but a counter is provided to register the number of times gas is admitted to the cylinders, the volume of which was previously determined. The cylinders are cooled by a supply of water under pressure, the warm water returning to the reservoir. The products of combustion are taken away by a common pipe which communicates, through a depositing chamber, with the outer air. These are said to be the largest gas pumping engines in existence, and their faculty of being instantly available, before steam could be raised in the best steam fire engine boiler, is held to compensate for the additional cost of working during the brief periods for which they alone would be required. They are said to give much satisfaction, and the theater-going public have great confidence in the safeguards from sudden fires thus provided.

Bending Copper Pipes by Hydraulic Pressure.—Messrs. W. Collier & Co., Manchester, England, have in hand a new machine for bending copper pipes by hydraulic pressure on a set of blocks. The pipes, which are first filled with lead, are put into the machine across two blocks, which can be fixed in any position, each block swiveling on a strong stud, and a third block, worked from a hydraulic cylinder, is pressed forward until the pipe is bent to the required form. The chief feature of the machine is the construction of the hydraulic cylinder and the ram, which works backward and forward much like a piston. This is effected by forcing water into and out of the cylinder at the back and front alternately. For this purpose the machine is provided with a pair of pumps driven by a strap. At the back of the machine is a plate carrying four weighted valves, so arranged that one pair of valves lets the water into the back of the cylinder while making an outlet for it at the front, and the second pair lets the water in at the front while opening an escape at the back. The whole of the valves are actuated by four cams upon a shaft carrying a handle, one quarter turn of which, by acting upon one pair of valves, forces the ram forward, and an additional quarter turn which brings the second pair of valves into action forces it backward.

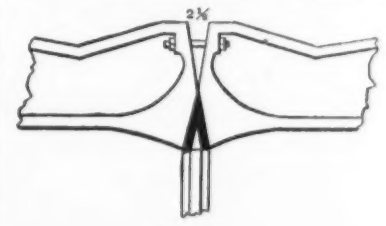


Fig. 6.

By this arrangement it is imposible for a man to force water in at both ends of the cylinder at once, while at the end of the cylinder an escape of the water is provided should the ram be forced too far forward.

A resident of New Jersey has produced a device, which has recently been patented, and which, it is claimed, will remove all further possibility of disasters attributable solely to unfortunate color blindness of engineers in charge of trains, or to the defects of the common railway signals. It appears that careful investigation of the ordinary signal light demonstrated the fault to be with them that they presented to the eye a single ray or point of light, which being of the same intensity of other lights about, is with difficulty distinguished from the latter, especially by those whose eyesight is treacherous. To obviate this, the inventor of the new signal has arranged one in such a way that it throws out, or rather presents to view in the distance, the shape of an elongated beam of light, which by some simple machinery can be simultaneously moved in a vertical plane and rotated, so that, unless an engineer were suddenly

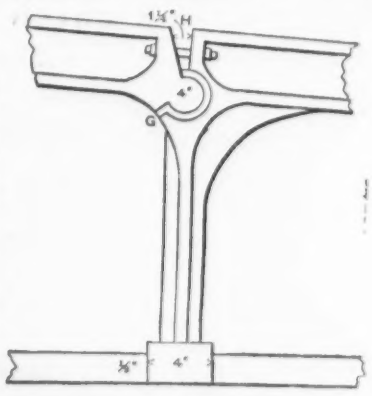


Fig. 7.

stricken blind altogether, it would be quite impossible not to distinguish the signal from other lights, and be thus placed on guard. The adoption of the new signal by railways generally would undoubtedly do away effectually with a large amount of those accidents which seem now to be absolutely un-

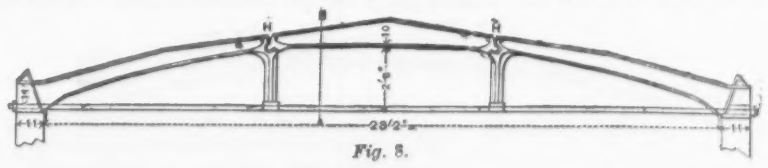


Fig. 8.

avoidable, and which often cause lamentable loss of life and the wreck of valuable rolling stock.

The technical school at Charlottenburg is in possession of a monstrous drawing board, 43 meters (141.08 feet) in length and 8.2 meters (26.9 feet) wide, used for designing in full size the details of vessels and machinery. It is composed of 500 separate parts, which, in order to avoid the use of nails, screws or glue are put together according to Unger's patent.

NEW AMERICAN FILE COMPANY

PAWTUCKET, R. I.,

MANUFACTURERS OF

FILES AND RASPS.

ESTABLISHED 1863.

Capacity 1000 dozen per day.

GOODS WARRANTED TO GIVE SATISFACTION.

CHAMPION ONE-MAN SAW

WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw. We make the following lengths, 3½, 4, 4½, 5 feet. Send for sample.

WHEELER, MADDEN & CLEMSON MFG. CO., Middletown, N. Y

HARVEY W. PEACE, VULCAN SAW WORKS, Brooklyn, E. D., N. Y.

Manufacturer of First Quality

Hand, Panel, and Rip Saws,

AND KINDRED GOODS.

Also, MILL, CROSS-CUT AND CIRCULAR SAWS.

BAND SAWS A SPECIALTY.

SOLD EVERYWHERE.

MANUFACTURED ONLY BY

ST. LOUIS STAMPING CO.,

ST. LOUIS, MO.

NEW YORK OFFICE, 57 Beekman St.

List on Application.

WM. A. CLARK'S PATENT EXPANSIVE BITS WITH TWO CUTTERS EACH,

Small Bit Boring from ¼ in. to 1½ in.; Large Bit Boring from ⅞ in. to 3 in. Warranted.

Made of Jessop's Cast Steel, and Parts Interchangeable.

Manufactured by

R. H. BROWN & CO., Westville, Conn., Successors to W. A. CLARK.

The Finest Forks Ever Before Made.

"CHAMPION"

Hay, Manure and Stable Forks,

Made exclusively by

The Iowa Farming Tool Co.,

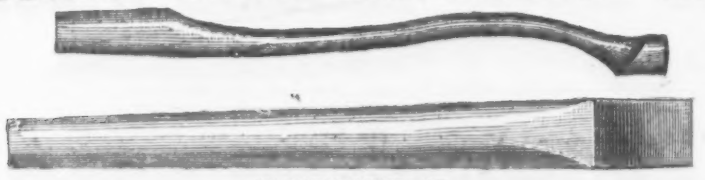
Fort Madison, Iowa.

Send for Illustrated List.

HUNDLEY & HANKS,

PROPRIETORS OF

NORTH CAROLINA HANDLE CO.,



MANUFACTURERS OF

Handles and Spokes,

79 Reade Street and 97 Chambers Street, - - - - NEW YORK.

HARDWARE COMMISSION MERCHANTS.

Beardsley Scythe Co.,

Manufacturers of

GRASS, GRAIN & BUSH SCYTHES,

Hay Knives & Corn Knives.

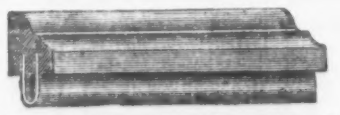
West Winsted, Conn.

See our advertisement in *The Iron Age* first issue of each month.

CHAMPION WEATHER STRIPS.

The Best in the Market.

For Sale by all Hardware Dealers.



Also manufacturers of Wood Carpet, Show Case, and Cabinet Moldings, &c.

DENNIS & CO.,

167 Madison St., CHICAGO, ILL.

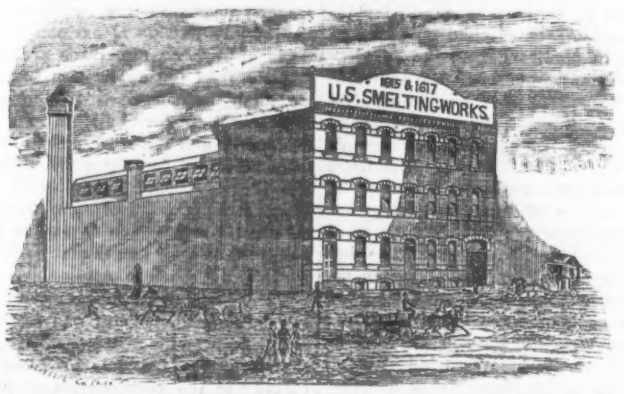
Factory, 337 and 339 W. Lake St.

Print Your Own Cards, Labels, &c. PRESSES, LARGER SIZE, $8. 13 other sizes. For business, pleasure, old or young. Everything easy by printed instructions. Send two stamps for Catalogue of Presses, Type, Cards, &c., to the factory.

KELSEY & CO., Meriden, Ct.

UNITED STATES SMELTING WORKS,

MANUFACTURERS OF



BABBITT AND TYPE METALS,

Brass Castings and Solders of all Kinds.

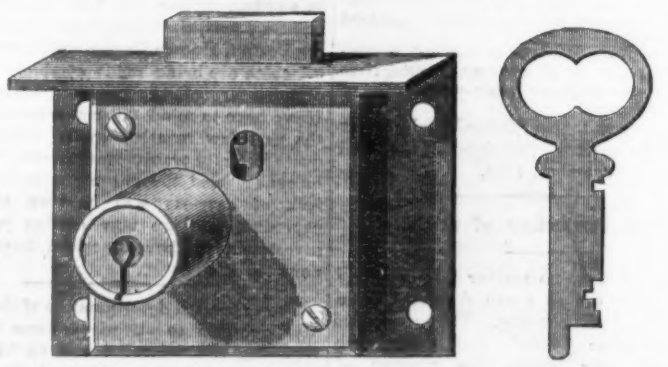
PIG AND BAR TIN. PIG AND BAR LEAD.

Pig Brass and Copper, Spelter, Antimony, &c.

1615 & 1617 Spring Garden Street, PHILADELPHIA.

GEORGE HUNT, M. S. STOKES.

TWO NEW LOCKS.



THE EAGLE LOCK CO.,

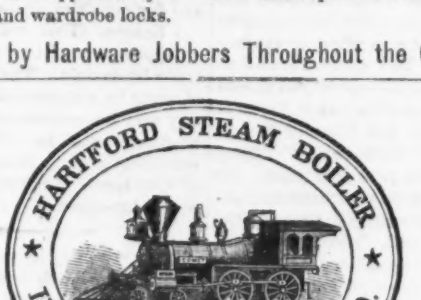
TERRYVILLE, CONN.,

Have just added two new and valuable patent locks to their already large variety, which will at once commend themselves to the trade.

No. 6101 (Brass) and 6117 (Iron), represented by the above cut, may be **locked** without using the key, by simply pressing on the plate in the end of the tube. The other patent, Nos. 6201 and 6217, is a lock similar in appearance, but is so constructed that with a small screw driver any dealer can adjust the lock to an endless variety of keys, or make his whole stock "alike" to fit one key, without opening the lock or affecting its security.

These patents have been applied only to drawer and cupboard locks as yet, but will soon be produced in chest and wardrobe locks.

For Sale by Hardware Jobbers Throughout the Country.



Issues Policies of Insurance after a careful inspection of the Boilers

COVERING ALL LOSS OR DAMAGE TO

Boilers, Buildings and Machinery,

ARISING FROM

STEAM BOILER EXPLOSIONS.

The Business of the Company includes all kinds of STEAM BOILERS.

Full information concerning the plan of the Company's operations can be obtained at the COMPANY'S OFFICE, HARTFORD, CONN., or at any Agency.

J. M. ALLEN, Pres. W. B. FRANKLIN, Vice-Pres. J. B. PIERCE, Sec.

Board of Directors:

J. M. ALLEN, President.
LUCIUS J. HENDEE, Pres't Ætna Fire Ins. Co.
FRANK W. CHENEY, Ass't Treas. Cheney Brothers Silk Manufacturing Co.
CHARLES M. BEACH, of Beach & Co.
DANIEL PHILLIPS, of Adams Express Co.
GEO. M. BARTHOLOMEW, Pres't Amer. Nat'l Bank.
RICHARD W. H. JARVIS, Pres't Colt's Fire Arms Manufacturing Co.
THOMAS O. ENDERS Sec'y Ætna Life Ins. Co.
LEVERETT BRAINARD of Case, Lockwood & Brainard.
GEN. WM. B. FRANKLIN, Vice Pres't Colt's Pat. Fire Arms Mfg. Co.
GEO. CROMPTON, Crompton Loom Works, Worcester
WILLIAM ADAMSON, of Baeder, Adamson & Co., Philadelphia.
HON. THOS. TALBOT, Ex-Governor of Mass.
NEWTON CASE, Case, Lockwood & Brainard, Hartford
WILLIAM S. SLATER, Cotton Manufacturer, Providence, R. I.
NELSON HOLLISTER, of State Bank, Hartford.
D. R. SMITH, Pres't Springfield Fire & Marine Ins. Co.

THE AMERICAN MACHINE CO.,

MANUFACTURERS OF

HARDWARE SPECIALTIES.

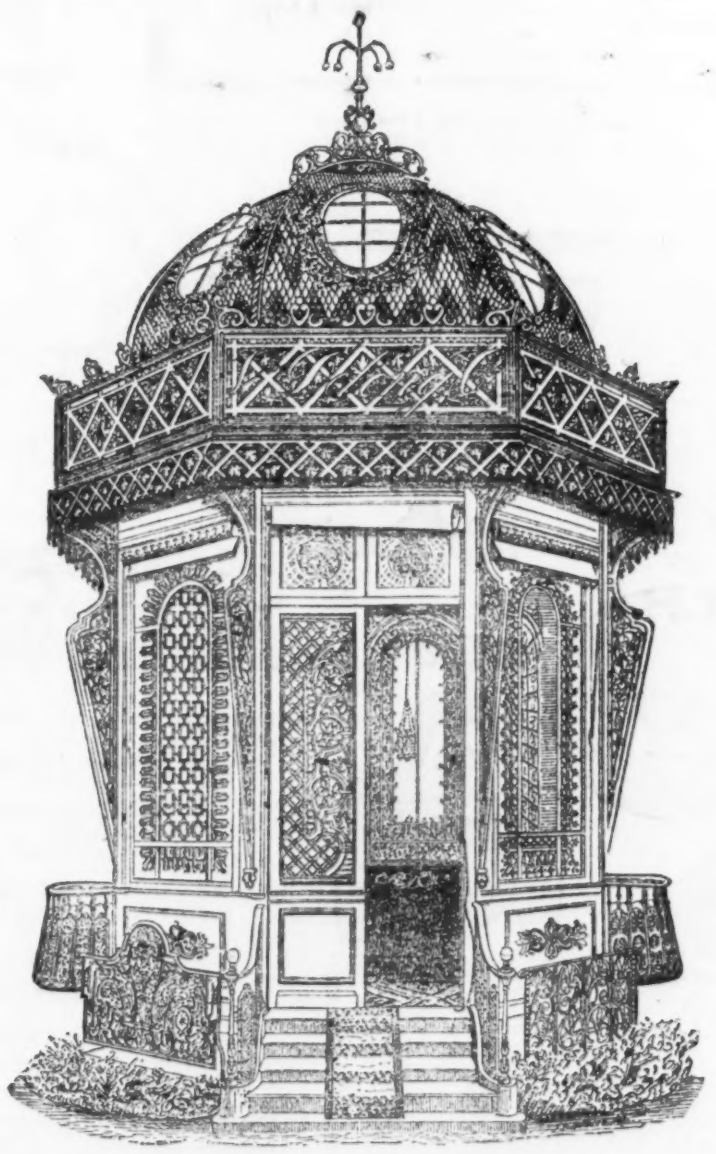
Office and Factory: *Lehigh Ave. and American St., Philadelphia.*

Branch House: *No. 198 Chambers St., New York*

SPECIALTIES: Fluting Machines, Hand Fluters, Plaiting Machines, Christmas Tree Holders, Bickford Portable Pump, Mrs. Potts' Patent Cold-Handle "Crown" Irons, Ice Cream Freezers and Cake Mixing Machines.

Decorative Cut Metal Work.

Below we give illustrations of the use of cut metal work, which formed a conspicuous feature of the Paris Exposition of 1878. The perforating of metal for decorative, ecclesiastical and domestic purposes by means of a machine saw, is one of the curiosities of Parisian industry. Some attention is being given to this same subject by American architects and American manufacturers, and therefore the description of what has been done in France cannot fail to be of material interest to our readers. The achievements of a small steel instrument working through dense sheets of metal, piled one on top of another, have been compared by a French critic to the easy action of a knife cutting through a roll of butter. Almost as extraordinary as the facility of a block of iron or plate of copper, or brass, or steel, are the numerous designs or purposes to which metal is applied. From the specimens of work exhibited, it would seem that nothing is required, from a memorial glass or palace gate, from a door panel or Gothic gate, or from a jewel box to a fender, that cannot be produced in metal work of this style by the aid of the instrument above referred to. Some of the smallest articles, such as monograms, are manufactured almost as minutely as hair work, and beautiful flowers are also produced in the same way. Not a little of this class of work has already been employed in the architecture of Paris. The whole façade of the Gymnase Theater has been ornamented with ironwork in this manner. We regret that as yet no description of the machine which is used to produce this work has reached us. All that has been written upon the subject, so far, has been in description of the products of the machine, rather than of the appliances used in manufacturing.



Decorative Cut Metal Work.—Fig. 1.

A curious feature in connection with this industry is that the leading spirit in the company which is engaged in this line of industry is a woman, Madame Delong by name. That a woman should have given the first impulse to such a masculine work, and that she should have improved it in silence until the Paris Exposition brought to light her kiosk displaying all the different decorative applications of cut metal work, is a fact almost without a parallel in industrial arts. Fig. 1 of our engravings represents the kiosk alluded to. Like many pavilions erected in fairs and expositions, its primary use was to show what can be done in cut metal work, and in this direction it is to be regarded as a success. Besides giving attention to the mere mechanical manipulations required to produce perforated metal work, much study has been given to the coloring of the work after it has been produced. The characteristics of ornamental work of this kind render it totally distinct from polished and engraved metal. There is a lightness and delicacy about it that contrasts favorably with the solidity of metal work generally. Colored metal work, it is said, has been used in Paris for the decoration of cornices, ceilings, &c., in the shape of griffins, arabesques and any style of ornamentation which taste decrees. The shading is so minute that the effect upon the eye of the observer is the same as finely painted work, and the presence of metal would scarcely be suspected.

Among the latest and most admired achievements of the company manufacturing work of this kind, are two stained windows representing exotic foliage and covered with beautiful metal work. One of the designs represents a Christmas tree entirely of copper, the branches being Gothic figures that reproduce cathedral sculpture. Among the most important works in this line executed for the city of Paris, are the entrance doors of the memorial monument of Bourget, the communion rails and chapel gate of St. Ambroise Church, and decorative work at the Gymnase Theater, already mentioned. We also learn that private orders of a no less sumptuous nature have been executed for the residences of the Rothschilds, and for a very large dry-goods establishment in Paris; also for the residence of the ex-Queen of Spain, and for one of the most prominent confectioners of that city.

Figs. 2, 3 and 4 of our illustrations convey some idea of the variety of uses to which perforated metal work may be applied. Fig. 2 represents the panels in a door treated in this way. The upper panels show the metal work used over glass, while the lower panels in the door to the left show its application over wood. A screen pattern is shown in Fig. 3, and a fire-screen pattern complete is shown in Fig. 4.

The Boston Exhibitions.

During September and October a number of industrial and mechanical exhibitions were in progress throughout the country, some of which deserve more than passing notice. At one of them special efforts were made to present such a display of building materials and appliances as would be of interest and value to architects, builders and house owners generally. None of them were lacking in features the careful study of which would be to the advantage of all mechanics in the building trades. Although these fairs are instituted primarily for advertising purposes, their value as educators is hardly second in importance. A visit to one of them is, in many cases, of more practical benefit to a mechanic than a month of experimental labor in seclusion. More ideas may be picked up in an hour's ramble among the machines and tools ordinarily displayed at a fair, than can in most cases be obtained by a great deal of reading. One must see a fair in order to appreciate it. a mere description conveys but a poor idea; We may say the display was grand or beautiful, that the building was well adapted to the purpose, that visitors attended in large numbers, and that the various parts were well balanced, forming a charming picture as a whole. The mind grasps the idea, being unencumbered with minor details. But when we enter into particulars and single out individual features for description, the task is less easily performed, and lucky indeed is the writer if his words do not entirely fail of their purpose.

Our ideas of what was to be seen at the exhibition of the Massachusetts Charitable Mechanic Association, held at Boston, were perhaps too high, for we were disappointed at what we found there. This association undertook to conduct an exhibit of building materials and appliances, and to this end issued a circular describing five groups in which the goods presented were to be arranged. The groups were as follows: Material, Construction, Sanitation, Comfort and Convenience, and Decoration. The first group was to contain gross materials, such as wood, plain and fancy, domestic and foreign; stone of all kinds, brick, plain and ornamental; iron, cement, lime, plaster, paints, glass, &c. The group entitled Construction was to contain departments of tools including machines for working wood, iron and stone, together with brick and tile machines; fire-proofing, including fire extinguishing apparatus; structural devices, including portable houses, trusses, roofing systems and scaffolds, and builders' hardware. Sanitation was to comprise the display of sanitary appliances, which meant such items as models of drainage systems, water-closets, disinfecting apparatus and plumbers' supplies generally; heating, ventilation and hygienic establishments. Comfort and Convenience was to include elevators, pumps, communication, which was explained to mean speaking tubes and telephones; safety, meaning fire escapes, automatic hatchways, &c.; lighting, including chandeliers, gas fixtures, gas machines, electric lights, &c. The last group, Decoration, was to embrace interior finish, including wall papers, tiles, furniture, hangings, &c. This programme, had it been successfully carried out, would have presented an exhibit of building materials not exceeded in importance by anything which has ever appeared in this country. It was not, however, successfully carried out. Odd exhibits belonging to each of the several groups named were to be found in various parts of the exhibition building, but nothing like a complete display in any one of the departments was to be met. The reasons for this were obvious upon a moment's reflection. At the present time the building business is experiencing an unwonted activity. People in the trade have no time for exhibiting their goods for the mere benefits likely to be derived in an educational way, and they are so full of orders that in many cases they do not care to exhibit them for advertising purposes. It would seem, therefore, that a complete array of the materials and appliances entering into buildings at the present day is hardly possible to gather together except in the way of establishing a museum. Detached portions may be found at any of the fairs, and the exhibition of the Massachusetts Charitable Mechanic Association showed scarcely more than would have been displayed had not this special programme been arranged. Nevertheless the effort put forth was a creditable one, and should it be repeated at some future time we trust it will be more successful.

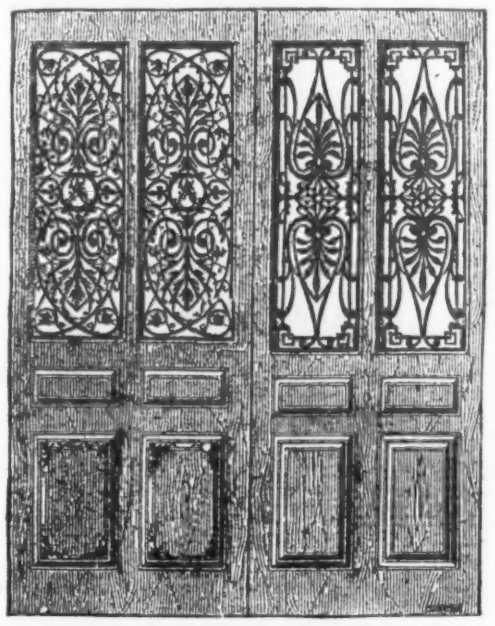


Fig. 2.

Two rival fairs at Boston have served to divide the interest of citizens and visitors. A disagreement in the management of the Massachusetts Charitable Mechanic Association, the parent institution, which occurred about the time of its last triennial exhibition, resulted in the formation of an opposition association, known as the New England Mechanics' Institute. The new organization conducted its first fair the present year, and the competition which has existed between the two associations has doubtless resulted in many features of interest which might otherwise have failed to appear. The building of the New England Fair, as it is familiarly termed, is one of the finest which has ever been erected for exhibition purposes. In construction it is substantial; the interior space is well lighted; the hight is ample, while the peculiar construction of the roof imparts to the whole an appearance of lightness and grace which well befits the purposes for which it was intended. The architect of this structure was Mr. Alden Frink, assisted by Messrs. Grafts & Forbes, engineers. The iron roof was erected by D. H. Andrews, and the mason-work was under the control of J. H. Coon. Leach & Harney supplied the foundations, while Messrs. Greesy & Noyes furnished the woodwork of the building. While the two exhibitions in some senses were rivals, the displays in very few cases were duplicates, and had the two formed one large exhibit, the display would undoubtedly have been better than anything that has ever been seen in this country, excepting only the Centennial Exhibition at Philadelphia.

Many of the well-known hardware establishments of the country were prominently represented at the fair of the New England Institute. The Providence Tool Company, of Providence, R. I., besides showing many samples of heavy hardware, ship hardware, nuts, bolts, &c., exhibited a very fine case of tools. The Stanley Rule and Level Company, of New Britain, Conn., showed a handsome case containing specimens of levels, screw drivers, tri-squares, pocket rules, gauges, bevels, &c. The Millers Falls Company, of Millers Falls, Mass., exhibited a fine line of the goods they manufacture, among which may be mentioned the Langdon Miter Box and an improved form of vise. E. M. Boynton, the well-known saw manufacturer, of 80 Beekman street, New York City, exhibited a very handsomely arranged case of saw blades, circular saws, &c, so displayed as to present a symmetrical appearance as a whole, and to admit of a careful examination of the individual pieces. The New England Butt Company, of Providence, displayed a fine line of locks, butts, shelf brackets, counter scales, scrapers and specimens of Murphy's bench clamp, which has already been mentioned in our columns. Messrs. Goodnow & Wightman, of 176 Washington street, Boston, presented a display which was instructive as well as interesting. A working model of an electric engine of diminutive size was a feature which attracted marked attention upon the part of visitors generally. Drills, reamers, blow-pipes, lathe chucks, improved tool rests, scroll saws, foot-power lathes and similar articles were of special interest to mechanics. The Prentiss Vise Company, of 23 Dey street, New York city, exhibited a fine line of the vises manufactured by them, a description of which appeared in our columns some time since. Other exhibits are well deserving of mention in this connection, but lack of space forbids.

Fig. 3.

The Wight Fire Proofing Company, of Chicago, was conspicuous at the fair of the Massachusetts Charitable Mechanic Association, because it was the only one making a display of fire-proofing systems. The exhibit was one of the most complete and most to the purpose of any contained in the fair. It showed the various applications of the process peculiar to this company by means of full-sized models of construction. Floor, walls, mansard roof, ceiling, and the manner in which iron columns are protected by the construction employed by this company were well illustrated. An examination of this exhibit caused one to feel how other exhibitors had failed to comprehend the possibilities of the occasion, and to keenly regret their lack of enterprise.

The New Tay Bridge.

The plans of the proposed new Tay Bridge, prepared by Mr. W. H. Barlow, C. E., are now being exhibited at the North British Railway offices, Edinburgh, for inspection by intending contractors. The new bridge, which is to be built on the girder principle, will commence on the south side, about 16 feet west of the former bridge. At this end four brick arches are shown next the shore, each having a span of 50 feet. The girder work then commences with a span of 118 feet from center to center of the piers, and is continued with 10 spans of 129 feet, and thirteen of 145 feet from center to center of the piers, until navigable portions of the channel are reached. Here there are 13 wider spans, 11 being 245 feet each and two 227 feet each. Of these spans the first four are carried to the greatest hight of the structure, and give 77 feet of clear headway above high-water mark. From this point the line of the bridge commences to fall toward the north, or Dundee side, at a gradient of 1 in 114, there being one span of 162 feet, ten of 129 feet 6 inches, and one of 127 feet 6 inches. These spans carry the bridge on to the commencement of the curve toward Dundee, and 25 more, each 71 feet, take the structure to the side of the proposed extension of the esplanade. Several other spans take the bridge on to the point where it is run into the level of the existing arches. The bridge is to be constructed for a double line of rails throughout. The foundations in the river bed will be formed of two wrought-iron cylinders, placed at a distance of 26 feet apart from center to center, and filled with concrete. These cylinders rise to the hight of within 2 feet of low-water mark, where brick will be used, filled in also with concrete. This brickwork is to be the hight of

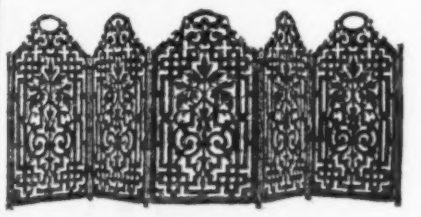


Fig. 4.

8 feet above high-water mark, at which level the cylinders are connected, and made to form a solid foundation, topped with a course of ashlar. Rising from this foundation, two piers are formed of wrought-iron pillars braced together, and incased with iron plates of from ⅜ to 7-16ths inch in thickness. The piers thus constructed are connected with each other near the top, and the whole has the appearance of a high and strongly-built arch on which to place the girders. The principal piers are octagonal in shape, with a diameter varying from 11 feet to 14 feet 6 inches. The spans are each composed of four girders, with the exception of the higher spans. These are of two girders connected together, top and bottom, with bracing and flooring. The bridge throughout its whole length will have a parapet of between 5 and 6 feet in hight, forming a wind guard. The depth of each girder on the piers is 16 feet 6 inches. The middle girders are 28 feet 9 inches in the center, and at the ends 20 feet 3 inches. They are of hog-back lattice form. The other girders are of plain lattice-work, and are all connected by cross bracing, on the top of which the train travels as it did on the old bridge. At the high girders the train travels between them. The platform of the bridge is of wrought iron throughout. In the construction of the new bridge, the old one will be sufficiently near for anchorage and cranes.

Electric Conductivity of Moist Air.—Some electricians have held that humid air acts as a conductor of electricity; and others, notably the Count du Moncel and M. Gaugain, have maintained that it does not. Recent experiments of M. Marangoni support the latter theory very decidedly, for he finds that a Leyden jar, heated so as to prevent condensation of moisture on its glass walls and thus arrest surface conduction, gives a long spark as in the driest air. When, however, the precaution of heating the walls of the jar is not taken, the moisture condenses on the latter, and forming a thin film of water, causes a silent discharge which might be mistaken for a slow discharge through the conducting air. It follows from these experiments that the loss of electricity on telegraph lines is wholly due to surface conduction over the wet and dirty insulators, or leakage along entangled threads and branches of trees at particular points, and not to a general discharge into the saturated air.

The handling of petroleum in considerable quantities is always attended by more or less danger, on account of its highly explosive properties. Mr. Schlumberger, who has devoted much time and attention to this subject, has recently proposed a method by which, it is claimed, all dangers of fire resulting from explosions of petroleum are avoided. His plan is to place upon the separate barrels of petroleum vessels of moderate size, filled with ammonia water. Should an explosion occur, these vessels would be broken and the escaping ammonia vapors speedily smother the spreading flames.

COVERT MFG. CO.,

SOLE MANUFACTURERS OF

COVERT'S

PATENT HARNESS SNAPS,

Chain and Rope Goods.

These goods are sold by all leading jobbers in General and Saddlery Hardware at manufacturers' prices.

Send for illustrated catalogue and price list.

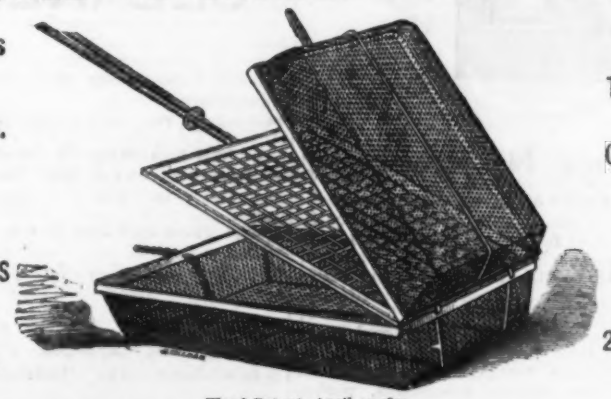
COVERT MANUFACTURING COMPANY,

WEST TROY, N. Y.

DOUBLE REVERSIBLE CORN POPPER.

OUTSELLS ALL OTHERS.

Close Prices TO Jobbers.



Double The Size OF Common Poppers.

Retails FOR 25 Cents.

Wood Patent, April 14, 1874.

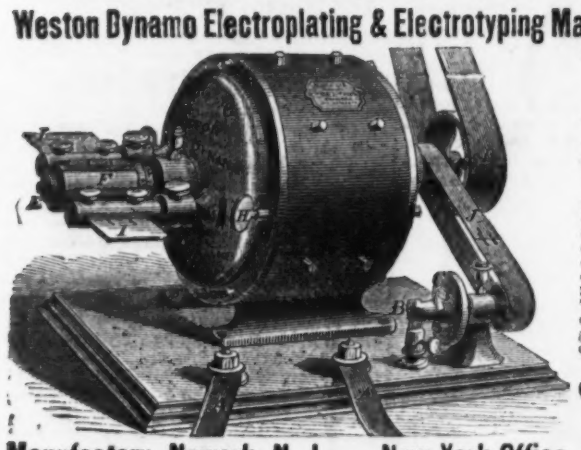
Made of Plated Wire. Durable and Handsome.

BROMWELL MANUFACTURING CO., Sole Makers, Cincinnati.

Agents: **W. H. QUINN & CO.,** 79 Chambers Street, New York.

HANSON & VAN WINKLE, Sole Agents for

Weston Dynamo Electroplating & Electrotyping Machines, Newark, N. J.



For Nickel, Bronze, Brass, Copper and Silver Plating.

Over 1000 machines in use.

Are used by all leading stove manufacturers.

Experienced men sent to put up machines and instruct purchasers.

INFRINGEMENTS.

We call attention to infringements of the Weston Machine in which Automatic Switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

MANUFACTURERS OF

Cast Nickel Anodes, Pure Nickel Salts, Polishing Materials.

Manufactory, Newark, N. J. New York Office, 92 & 94 Liberty St.

Five successive shots, at 50 feet, "off hand," with a Stevens Rifle, made by "Wild Harry" the Indian scout.

If you doubt that it can be done, just step into Barnum's Circus when it comes around, and you can see him ring a bell every time through a quarter-inch bull's eye, or shoot the ashes from a cigar held in another person's mouth and many other wonderful shots.

We add a couple of testimonials out of a large number we have received so far this month.

JAMESTOWN, N. Y., Nov. 7, 1881.

J. STEVENS & Co.—*Gents:* Enclosed find draft for bill. The rifle just made for me gives entire satisfaction so far as appearances go to make a perfect gun. It is the finest balanced gun ever yet brought here. I have not tested it yet, but feel satisfied it will shoot as well as it looks, as all the other ones have. Yours truly, B. H. BURNS.

SEARCY, ARK., Nov. 6, 1881.

Gentlemen: I went out on the 21st of October with a Stevens 24 in. 32 calibre rifle, and killed five wild turkeys, and again on the 29th of October and killed six more, making 11 in two days' hunting with the same little gun. I killed one of them at 100 yards, and another at 150 yards, and can kill one at 200 yards. I consider your rifles the neatest, simplest, strongest and best gun in the market.

Yours, R. P. BAKER,
Co. Examiner, White Co., Ark.

Price Lists upon application to

J. STEVENS & CO., Chicopee Falls, MASS.

N. Y. AGENT: CHARLES FOLSOM, 106 Chambers Street.

PHILADELPHIA SMELTING COMPANY, Limited,

S. E. Cor. Twelfth and Noble Sts., PHILADELPHIA.

GENUINE BABBITT, Guaranteed at a speed of 10,000 a minute, and at any pressure for 10 years.

Office JAMES BUTTERWORTH & SON, Manufacturers of Woolen Machinery, 262, 264 and 266 E. Adams St., PHILADELPHIA, October 17, 1881.

PHILADELPHIA SMELTING COMPANY.—GENTLEMEN: We have been running your "Genuine Babbitt" on our wood drilling machine for the last eight years at a speed of 5000 revolutions per minute, without renewal. We have found it to be the best metal we ever used.

Yours truly, JAMES BUTTERWORTH & SON.

DEOXIDIZED BRONZE,

Superior to Phosphor Bronze or any other alloy of Copper and Tin for Machinery Journals.

PHILADELPHIA, October 4, 1879.

PHILADELPHIA SMELTING COMPANY, City.—GENTLEMEN: After a trial of eighteen months of your "Deoxidized Bronze" as journal boxes in our rolling mill, where great pressure is required, we take pleasure in recommending it as being superior to any we have heretofore used.

Very truly, HENRY DISSTON & SONS.

JACK SCREWS,

Press Screws, &c.,

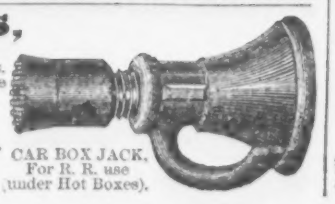
Cast with Perfect Seamless Thread by our new patent process. Cheaper than Wrought Iron, not so apt to bend or strip the thread. Liberal discount to the trade.

SEEGER MFG. CO.,

Box 1513, - - SPRINGFIELD, MASS.

H. E. ASHCRAFT, Agent,

12 Murray St., and 15 Park Place, New York.



CAR BOX JACK, For R. R. use (under Hot Boxes).

BELLAIRE NAIL WORKS,

PIG IRON AND NAILS,

Manufacture the Celebrated Brand of

BELLAIRE NAILS,

Office and Works, **Bellaire, Ohio.**

ELBA IRON & BOLT CO., Limited.

MANUFACTURERS OF

MERCHANT BAR IRON,

Skelp Iron, Splice Bars, Railway Track Bolts, Car, Bridge, and Machinery Bolts, Nuts, &c.

We invite the attention of RAILROAD MEN especially to our make of SPLICE BARS and Track Bolts. Using the best brands of REFINED IRON, and paying close attention to the finish of our manufactures, we are enabled to offer our patrons BOLTS, NUTS, SPLICE BARS, &c., of excellent quality. Our works have been enlarged within a few years; all orders are now executed with promptness; all our work guaranteed.

SEND FOR PRICE LISTS AND INFORMATION TO

ELBA IRON & BOLT CO., Limited, Pittsburgh, Pa.

PHILADELPHIA SCREW CO., Limited,

Twelfth and Buttonwood Streets, PHILADELPHIA.

Manufacturers of

IRON & BRASS WOOD SCREWS.

Quality, finish and tests as to strength guaranteed equal to any in the market.

With improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts. A full line in stock.

E. C. ATKINS & CO.

METHOD OF MANUFACTURE PATENTED

SHEFFIELD SAW WORKS.

SPECIALTY: LARGE CIRCULAR SAWS.

SOLE MANUFACTURERS OF THE GENUINE SILVER STEEL DIAMOND X CUT SAW

INDIANAPOLIS, IND.

The Farrel Foundry and Machine Co.

ANSONIA, CONN.,

Manufacture Improved

ROCK & ORE BREAKERS,

(THE "BLAKE" STYLE),

View of Rock Breaker.

designed for breaking to small pieces and one-third dust all kinds of hard and brittle substances, such as **Quartz, Emery, Gold and Silver Ores, Coal, Plaster, Iron, Copper and Lead Ores**; also, **Stone** for making **Concrete and Railroad Ballast.**

Premium of Excellence, American Institute Fair, 1879.

Twenty years of practical test, at **Home** and **Abroad**, has proven this machine to be the best one ever invented for the purpose. Mr. S. L. MAESDEN, for the past fifteen years connected with the manufacture of these machines, has charge of this department of our works, and will personally superintend their erection within a reasonable circuit. **Chilled Rolls and Rolling Mill Machinery; Power Presses,** single and double acting; also, **Hammers,** Drops and Lifters; **Shafting, Pulleys and Hangers.**

COPELAND & BACON, General Agents, 85 Liberty St., New York.

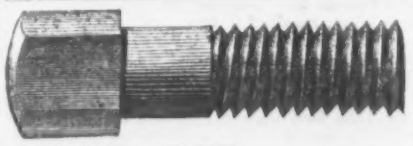
RHODE ISLAND HORSE SHOE CO.,

MANUFACTURERS OF

Horse, Mule & Snow Shoes of the Perkins Pattern

Works at Valley Falls, R. I. Office, 31 Exchange Place, Providence, R. I.

P. W. CARPENTER, President. C. H. PERKINS, Gen'l Manager. R. W. COMSTOCK, Secretary.



M-CHINISTS' SUPPLIES. - - - -

JOHN FELLOWS,

Manufacturer of

SCREWS, NUTS & BOLTS.

Piano Hardware, Agraffes and Novelties in Metal.

Wholesale and Retail Dealer in

IRON, STEEL & BRASS

No. 70 Broadway, Brooklyn, E. D.

THE COMBINATION

IRON CLAD STEEL HORSE SHOE CO., SELF WELDING STEEL TIRE CO., BILLET AND WIRE CO.,

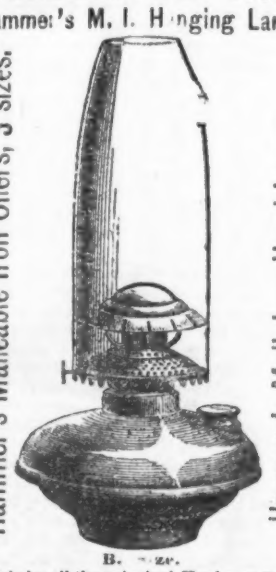
Sole and exclusive manufacturers of "Wheeler's Combination" Shoes, Shoe Bars and Toe Calks. Tire and Wire. Full particulars upon application by mail or otherwise to **WARE B. GAY,** Treasurer, **66 State Street, Boston, Mass.** All persons cautioned against infringements.

PATENTED ARTICLES OF

MALLEABLE IRON:

Hammer's M. I. Hanging Lamps.

Hammer's Adjustable Clamps.
Hammer's Malleable Iron Oilers, 3 sizes.



Hammer's Mall. Iron Hand Lamps.
NEW pattern Heavy Screw Clamps; strongest in the market.

B. ~ ze.

For Sale by all the principal Hardware Dealers. Send for price list.

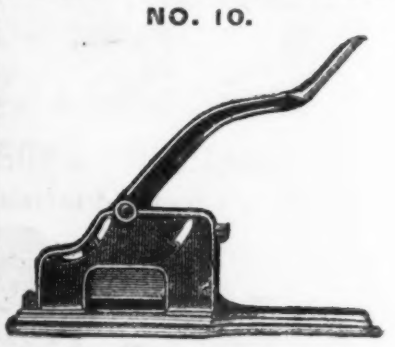
Malleable Iron Castings of superior quality, and Hardware Specialties in Malleable Iron made to order.

HAMMER & CO.,

Branford, Conn.

Acme Tobacco Cutter

NO. 10.



Manufactured by

F. F. Adams & Co., Limited

ERIE, PA.

The Iron-Masters' LABORATORY.

Exclusively for the

Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

No. 339 Walnut St., Philadelphia.

With Branch at Warrenton, Virginia,

J. BLODGET BRITTON.

This laboratory was established in 1866, at the instance of a number of practical Iron Masters, expressly to afford prompt and reliable information upon the chemical composition of the substances above mentioned, for smelting and refining purposes. The object being to make it at once a convenient, practically useful, and comparatively inexpensive adjunct to the Furnace, Forge and Rolling Mill.

CHARGES TO IRON WORKS.

For determining the per cent. of Pure Iron in an ordinary Ore	$4.00
For the per cent. of Pure Iron, Sulphur and Phosphorus in do	12.50
For each additional constituent of usual occurrence	1.50
For those of unusual occurrence or difficult to determine, the charge must necessarily depend upon circumstances.	
For determining the per cent. of Sulphur or Phosphorus in Iron or Steel	7.00
For each additional constituent of usual occurrence	6.00
For the per cent. of Carbonate of Lime, and insoluble Silicious Matter in a Limestone	10.00
For each additional constituent	8.00
For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal	12.50

For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.

For a written opinion or letter of instruction the charge must necessarily depend upon circumstances.

Printed instructions for obtaining proper average samples for analysis furnished upon application

---

GIES & Co.

"LITHOGRAPHERS" AND "PRINTERS"

BUFFALO, N.Y.

POSTERS, SHOW CARDS & CIRCULARS.

TOUR PAMPHLETS & CATALOGUES A SPECIALTY.

BLANK BOOKS MADE TO ORDER.
WOOD ENGRAVING AND ELECTROTYPING

GEO. M. EDDY & CO.,

Manufacturers of

Measuring Tapes

Of Cotton, Linen & Steel.

ALL PURPOSES.

351 to 353 Classon Ave., Brooklyn, N.Y.

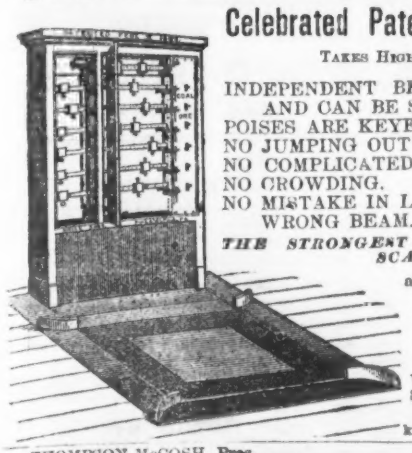
FINE WOOD PHOTO-ENGRAVING

SEND COPY FOR ESTIMATE. IT WILL PAY YOU. 702 CHESTNUT ST. PHILADA PA

CROSSCUP & WEST.

RIEHLÉ BROTHERS'

Celebrated Patented Furnace Charging Scale.



TAKES HIGHEST PREMIUM WHENEVER EXHIBITED.

INDEPENDENT BEAMS. EACH BEAM IS NUMBERED AND CAN BE SEEN TO OPERATE.
POISES ARE KEYED AND CANNOT SLIP.
NO JUMPING OUT OF BEAM.
NO COMPLICATED JOINTED LEVERS TO RAISE BEAM.
NO CROWDING.
NO MISTAKE IN LOOKING AT INDICATOR AND USING WRONG BEAM.

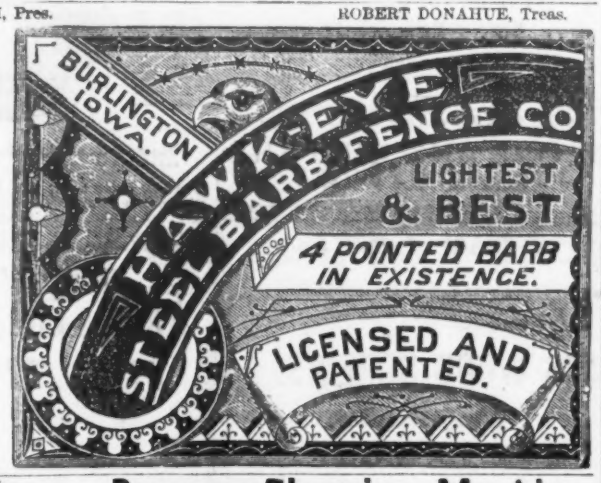
THE STRONGEST AND ONLY PERFECT CHARGING SCALE IN THE MARKET,

and always preferred by experienced furnacemen. Ask any furnaceman. Send for Circulars and Prices.

RIEHLÉ BROS.,
Works, 9th above Master. Store, 4th above Chestnut. **PHILADEL'A.**

Send for prices of Scales and Testing Machines of all kinds. Tests of material made daily.

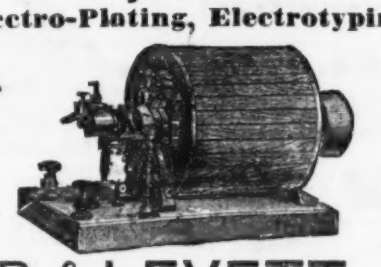
THOMPSON McCOSH, Pres. ROBERT DONAHUE, Treas.



The American Dynamo-Electric Machine,

For Electro-Plating, Electrotyping, &c.

Requires no Water. Combining all the



Latest Improvements. Cannot Reverse Current.

ZUCKER & LEVETT, Genl. Agents,

Manufacturers and Importers of NICKEL PLATERS' SUPPLIES.

510, 512 & 514 WEST 16TH STREET, N. Y.

Torrey's Door Springs.

S. ROEBUCK & CO.,
Manufacturers,

164 Fulton St., NEW YORK.

Torrey's Patent COG WHEEL

Ice Cream Freezers.

Torrey's Door Springs.

S. ROEBUCK & CO., Manufacturers. *164 Fulton St., New York.*

WASHERS.

WASHERS.

Cuyahoga Falls, Ohio.

Tinned Belt Rivets AND Burrs a Specialty.

A. J. DAVIS & CO.,

Patent Friction Hoisting Engines

For Mines, Quarries, Dock Building, &c.

MANUFACTURERS OF

SHAPERS, DRAIN PIPE MACHINES, BAG AND SATCHEL MACHINERY,

Steam Engines, Wire Drawing Machinery, &c., &c.

69 N. J. R. R. Avenue, Newark, N. J.

Correspondence solicited

HARCOURT PATENT

BAGNALL & LOUD,

BOSTON, MASS.,

Sole Manufacturers in U. S. A. of our Celebrated

METALINE AND

Star Roller Bush Tackle Blocks.

Send For Illustrated Catalogue.

New York Warehouse, 33 South St.

STAR ROLLER.

COAL OIL VAPOR TORCH

For Foundries, Machine Shops, &c.

Manufactured by

VAPOR OIL STOVE CO.,

No. 99 Ontario St., Cleveland, O.

Send for Circular.

☞ This is the only Coal Oil Vapor Torch protected by U. S. Patents: all others are infringements.

WITHEROW & GORDON,

Engineers & Contractors,

PITTSBURGH, PA.

Sole Agents for the

WHITWELL HOT BLAST STOVES.

OVER 600 IN USE.

The following parties either have them in use or under construction.

Cedar Point Iron Co., N. Y
Dunbar Furnace Co, Pa.
Crane Iron Co., Pa.
Pennsylvania Steel Co., Pa.
Neshannock Iron Co. Pa.
R. H. Coleman, Lebanon, Pa.
Chester Rolling Mill Co., Pa.
Davenport, Fairbairn & Co., Pa.
Isabella Furnace Co., Pa.
Paxton Furnaces, Pa.
Spearman Iron Co., Pa.
Etna Iron Works, Ohio.
Milton Coal and Iron Co., Ohio
Winona Furnace Co., Ohio.
Moss & Marshall, Ohio.
H. Campbell & Sons. Ohio.
Hocking Valley Iron Co., Ohio.
Cleveland Rolling Mill Co., Ohio.
Meier Iron Co., Ill.
North Chicago Steel Co., Ill.
Union Iron and Steel Co., Ill.
Means & Culbertson, Ky.
Ashland Furnace Co., Ky.
Norton Iron Co., Ky.
Southern States C. I. and S. Co., Tenn.
Sewanee Furnace Co., Tenn.
James C. Warner, Rising Fawn, Ga.
Ohio Iron Co., Zanesville, O.
Sloss Furnace Co., Ala.

HUBBELL'S PATENT METAL CORNERS

FOR OIL CLOTH,

With Binding to Match.

Protect them from wearing and are ornamental. These goods need only be seen by the public; the real merits are at once appreciated. Sample orders solicited and circulars sent on application.

RAY HUBBELL,
Patentee and Sole Manuf'r in U. S. and Canada,
Northville, Fulton Co., N. Y.

STAR LOCK WORKS.

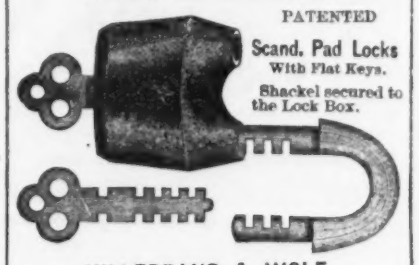
ESTABLISHED 1836.

Trunk Locks, Pad Locks, Dead Latches,

Door Springs, Trunk Stays, Keys, &c., &c.

110 South 8th St., and Sansom, bet. 8th and 9th, PHILADELPHIA.

PATENTED



Scand. Pad Locks With Flat Keys. Shackel secured to the Lock Box.

HILLEBRAND & WOLF.

Tree and Hedge Trimmer.

Unsurpassed for cheapness and durability. Unlike any other make, it combines a perfect lever principle with a blade working in a slotted steel hook.

Send for illustrated circular and price list.

E. S. LEE & CO.,
164 West Main St., Rochester, N. Y.

Established 1838.

Bevin Bros. Mfg. Co.,
Easthampton, Ct.

Manufacturers of

SLEIGH BELLS,

House, Tea, Hand, Gong Bells, &c.

Bell Metal Kettles.

ZERO REFRIGERATOR,

with Water, Wine and Milk Cooler. Best Food and Ice Preserver in the world. Send for Book. A. M. LESLEY, 380 Sixth avenue.

Also the Rotunda Furnace.

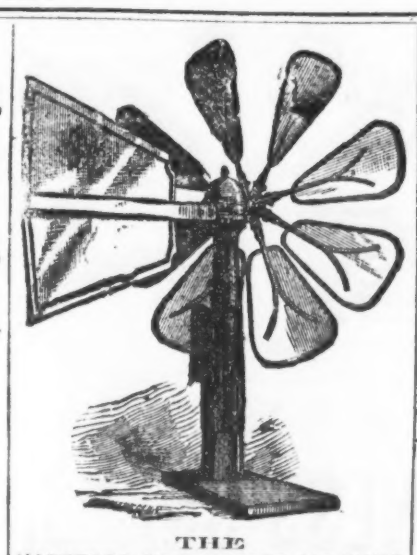
The Patent Combined

Dinner Pail and Lantern.

The most perfect Dinner Pail in the world. Hot coffee for dinner and a Lantern at night.

Manufactured by JOS. HAIGHT, PORT CHESTER, N. Y.

Sent by express on receipt of $1.00. Agents wanted.



THE

HARTFORD COMPRESSED AIR PUMP

Water Driven to any Hight and Distance by Compressed Air.

Country Houses Supplied Cheaply and Certainly for Bath Rooms, Water Closets, Hot and Cold Water Faucets, &c. Plenty of Fresh Water for Stock on Farms. The best Pump for Irrigating, supplying Railroad tanks, and for Mining purposes. For Circular and Price list address, **EZRA BROOKS,** Sec'y and General Manager of The Hartford Compressed Air Pump Co., **Hartford, Conn., U. S. A.**

George N. Pierce,

BUFFALO, N. Y.,

Manufacturer of

Bird Cages & Refrigerators

Send for Illustrated Catalogue.

Prices quoted upon application to BUTLER & DIEL, agents at Syracuse, N. Y.; OPEN STOVE VENTILATING CO., 78 Beekman st., New York, or GEO. N. PIERCE, sole manufacturer, Buffalo, N. Y.

WHOLESALE AGENTS.

L. SCHILLENGER, Syracuse, N. Y.
PRATT & CO., Buffalo, N. Y.
PRATT & CO., Elmira, N. Y.
EATHBONE, SARD & CO., Detroit, Mich.
H. W. LENTKEMEYER, Cleveland, Ohio.

THE GIANT PAD LOCK.

Manufactured by

THE SMITH & EGGE MFG. CO.

(Centennial Award.)

"Superior in Every Respect."

This is one of the **best selling Locks** in the market, and affords the dealer a large profit. It is thoroughly and strongly made—of the best material—very handsome in appearance, and every Lock is warranted. Orders solicited. Address as above

Lock Box 1705, Bridgeport, Conn.

HAMMOND'S Window Springs

Lock and support upper and lower sashes—all sizes. Are very convenient, simple and durable. Sample to the Trade free.

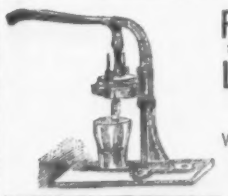
W. S. HAMMOND,
Lewisberry, York Co., Pa.
Circulars give full instructions.

NORTH BROS.,

23d and Race Sts., Philadelphia.

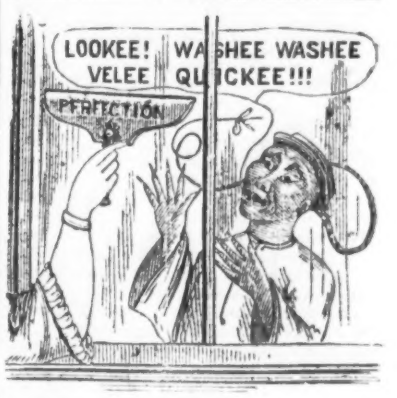
Fine Light and Medium-Weight GRAY IRON CASTINGS to order.

Correspondence solicited.



R. Onderdonk,
Sole Manufacturer of
LEVER LEMON SQUEEZER,
With Perforated Strainer.
405 Grand St, NEW YORK.

VERMONT SNATH CO.,
Manufacturers of
Pat. Swing Socket Snaths
and also a large variety of other styles of Snaths
Springfield, Vermont.
Represented in New York by Lamson & Goodnow Mfg. Co.



Notice to the Trade.

There are Six Patents, Domestic and Foreign, on

RUBBER WINDOW CLEANERS.

We own them all, and shall suppress infringements.

The genuine Cleaner is plainly stamped, "MANUFACTURED BY PERFECTION WINDOW CLEANER CO., INCORPORATED JULY 26, 1878."

Has Patent Hollow Handle with P. W. C. Co., cast in face.

Our manufacturing facilities are so large that we undersell cheap and worthless infringements.

We gladly mail sample cleaner with price lists to wholesale trade. Address

PERFECTION WINDOW CLEANER CO.,

167 Madison St., Chicago, Ill.

TO MANUFACTURERS.

This cut represents the **DANGLER VAPOR OIL TORCH,** especially adapted for machine shops, foundries, rolling mills, engine rooms, &c. For further information address,

DANGLER V. S. & R. CO.,
Cleveland, Ohio.

Pat. Oct. 16, 1880. and Aug. 23, 1881.

THE HENLEY ROLLER SKATE.

The latest and best light running, easily adjusted, perfect. The Challenge Skate of the world. For price list and further particulars address

M. C. HENLEY, Patentee & Manuf'er,
309 N. 14th St., Richmond, Ind.

Bohren's Improved Rubber Ball Faucet,

It stands the strongest Vinegar. Has a more rapid flow than any other.

The best Wood and Metal Faucet yet made. Never leaks, splits or shrinks. Is as durable as the **brass stop-cock** and is much cheaper. It does not poison the liquids. It is especially **adapted for Export,** as it is not affected by **shrinkage.**

U. BOHREN & CO., Manufacturers,
250 West 27th Street, New York.
Send for Circular and Price List.

Cost of Electric Lighting as Compared with Gas.—The Brush Electric Light Company receives $7400 per annum for lighting Fourteenth street from Fourth to Fifth avenue, Fifth avenue and Broadway from Fourteenth to Thirty-fourth street, and the latter street from Fifth avenue to Broadway. In addition to the lights on these streets the company is required to furnish two groups, of six lights each, in Union and Madison Squares, respectively. The street lamps have been in operation several months, those in the squares for a shorter period. The illumination is said to be fairly satisfactory, though, as was anticipated, the tower lights are effective only upon a small area, and it is likely that their effect will be seriously impaired by the heavy foliage in summer time. The total number of gas lamps which it has been possible to extinguish by the substitution of electric lamps is 430. The city formerly paid $17.50 per lamp per annum, which is estimated to have been at the rate of about $1 per thousand cubic feet, net, and that rate was so low that the gas companies did not care about lighting the streets. The gas lights, therefore, cost the city (and probably the producer) $7525 per annum, and are replaced by the electric light at a cost of $7400. It is not known, however, whether the Brush company makes or loses money at this rate. The advertisement alone is worth something, and it is possible this was taken into account in making the contract. At all events, there seems to be very little margin of difference where gas is furnished at $1 per thousand cubic feet. This, however, is much less than the cost of gas to private consumers.

Radiophony.—E. Mercadier gives this name to the phenomenon discovered by Bell, in which an intermittent radiation of a definite period produces a sound of the same period. He has arrived by experiment at the following results: 1. Radiophony does not appear to be an effect of the receiving plate vibrating transversely, like an ordinary vibrating plate. 2. The nature of the molecules of the receiver and their mode of aggregation do not appear to exercise a predominant influence upon the nature of the sounds produced. 3. The sounds result from the direct action of the radiations upon the receivers. 4. The phenomenon seems to result principally from an action upon the surface of the receiver. 5. The radiophonic effects are relatively very intense. 6. They appear to be produced principally by calorific radiations or waves of great length.

Special Notices.

Second-Hand & New Machinists' Tools.

In Store Oct. 27, 1881.

Two Car Axle Lathes. Hewes & Phillips. New.
One 56 in. x 13 ft. Horizontal Boring Lathe. Fond.
One Engine Lathe, 32 in. x 24 ft. Wood & Light triple geared. Nearly new.
One Engine Lathe, 36 in. x 18 ft. Putnam.
One Engine Lathe, 36 in. x 15¼ ft. Good order.
One Engine Lathe, 34 in. x 17 ft. Pond.
One Engine Lathe, 30 in. x 15½ ft. New Haven.
One Engine Lathe, 26 in. x 18 ft. Ames. New.
One Engine Lathe, 27 in. x 17 ft. B'klyn S. E. Works.
One Engine Lathe, 24 in. x 12 ft. Ames. New.
One Engine Lathe, 24 in. x 10 ft. New Haven.
One Engine Lathe, 20 in. x 8 ft. Ames. New.
One Engine Lathe, 20 in. x 14 ft. Fifield. New.
One Engine Lathe, 20 in. x 10 ft. Fifield. New.
One Engine Lathe, 20 in. x 12 ft. Harrington.
One Engine Lathe, 20 in. x 10 ft. Pond.
One Engine Lathe, 20 in. x 10 ft. Phœnix.
One Engine Lathe, 18 in. x 6 ft. J. & L. [head.
One Engine Lathe, 18 in. x 8 ft. J. & L. With turret
Six Engine Lathes, 16 in. x 6 ft., 7 ft. & 8 ft. Ames. New.
Four Engine Lathes, 16 in. x 8 ft. Harrington.
One Engine Lathe, 16 in. x 6 ft. Bridgeport Mch. Iron
One Engine Lathe, 15 ft. x 8 in. P. & W. [Works.
One Engine Lathe, 15 ft. x 6 in. P. & W.
One Engine Lathe, 13 in. x 4½ ft. Good order.
One Engine Lathe, 12 in. x 7 ft. Hewes & Phillips. A1.
One Engine Lathe, 15 in. x 6 ft., with turret head.
Two Sensitive Drills. [Flather. New.
One Radial Drill, 52 bk. g. and self-feed, nearly new.
One 20 in. Drill. Prentice. Hilles & Jones.
Three 24 in. Upright Drills. Ames. New.
Four 20 in. Upright Drills. Prentice. New.
Three 16 in. Upright Drills. Prentice. New.
One Index Millers. Pond.
One 15 in. x 5½ ft. Fox Lathe. New. Sq. arbor.
Two Gould Milling Machines.
One No. 3 E. H. Garvin & Co. Hand Miller. New.
One No. 2 Pratt & Whitney Miller. Lincoln.
Fifty Lincoln Pattern Milling Machines.
One Gear Cutter, 24 in. Gould.
Six Hand Lathes, 11, 14 and 16 in. S. x 4½ to 7 ft. bed.
One 24 in. Shaper. Hendey Mch. Co., new.
One 14 in. Shaper. Hendey Machine Co. New.
One 15 in. Shaper. Steptoe. New.
One 15 in. Shaper. Gould. New.
One 12 in. Shaper. Gould. Second-hand.
One 9 in. Shaper. Hewes & Phillips.
One 30 in. x 8 ft. Planer. Hewes & Phillips. New.
One 24 in. x 6½ ft. Planer. Harris. Good Order.
One 24 in. x 8 ft. Planer. Aldous, G. & Co.
Three 15 in. x 3 ft. Planers.
One Crank Planer, 12 in. stroke. A1.
One Suspension Drill, Back Geared. A1.
One 6-Spindle Horizontal Drilling Machine.
One 1000 lb. Sweet's Steam Hammer. [gine. New.
One 14 in. x 30 in. Baird and Huston Slide-Valve En-
Belting, Shafting, Pulleys and Miscellaneous Machin-
Lot of Wood-working Machinery. [ery.

E. P. BULLARD, 14 Dey St., New York,
GENERAL EASTERN AGENT FOR
Akron Iron Co.'s Hot Polished Shafting.

Wanted.

A situation in a Hardware house by a young man who is competent to fill a responsible position and willing to work hard and pay strict attention to business. Can furnish first-class references.
Address THOMAS,
Office of *The Iron Age*, 83 Reade St., New York.

Hardware Business For Sale.

Ten years established. Stock is clean and well assorted. City is growing very fast; large amount of building now in progress. Address
W. C. ROGERS,
Manchester, N. H.

$15,000

Will purchase a manufacturing business that will pay $30,000 to $50,000 yearly. The article is in universal use; is Staple in the Grocery, Hardware and Housefurnishing trades, and being protected by four Patents is a monopoly.

This unusual offer is made because the owner is in ill-health and must retire from all business.

Full particulars by addressing,
E. P. HALL,
167 Madison St., Chicago, Ill.

Wanted to Lease,

A BLOOMARY FORGE,

With four to six fires. Water power preferred. In answering advertisement, give size of buildings, construction of fires and price asked.
Address CHARCOAL BLOOM,
P. O. Box 1040, New York City.

SITUATION WANTED—At once by a young man with 15 years' experience in the general Hardware trade. The best of references furnished. Address E. L., Box 90,
Office of *The Iron Age*, 83 Reade St., New York.

Special Notices.

New and Second-Hand

MACHINERY.

One Horizontal Engine, 3 in. x 6 in.
One Beam Corliss Engine, 500 H. P.
Portable Engines from 10 to 25 H. P.
Two Horizontal Return Tub. Boilers, 100 h. p. each.
One Hor. Tubular Boiler, 6 ft. x 14 ft., 67 4-in. tubes
Two Hor. Tub. Boilers, 4½ ft. x 13½ ft., 43 4-in. tubes
One Locomotive Steel Boiler, 30 h. p.

MACHINISTS' TOOLS.

Two Lathes, 14 in. x 4 ft., 4 in. bed.
One No. 2 Woodward Pump.
Five Lathes, 22 in. x 12 ft. New.
Five Lathes, 18 in. x 8 ft. New.
One Lathe, 17 in. x 8 ft. Lincoln.
Two Lathes, 16 in. x 6 ft. Wood & Light.
One Lathe, 16 in. x 6 ft. Blaisdell.
One Planing Machine, 36 in. x 8 ft.
One Milling Machine, No. 4. Wood & Light.
One Burleigh Rock Drill, No. 4. New
One Pipe Cutting Machine.
One Styles & Parker Foot Press.
One Bliss & Williams Foot Press.
One Peck, Stow & Wilcox Foot Press.
One Cameron Steam Pump, No. 2.
One Knowles Special Pump, No. 7.
One 6 in. Tapping Machine. D. Saunders' Sons.
One Daniels Planing Machine.
One 100-ton Hydraulic Press and Pump.
One Root Engine.
One Pipe Cutting Machine.
One pair Paper Rolls.
A large stock of Shafting, Pulleys, Hangers, Vises (Wrought and Cast), and other Miscellaneous Machinery.

J. GRAY'S MACHINERY DEPOT,
37 Dey Street, New York, U. S. A.

OF INTEREST TO FOUNDRYMEN.

For Sale or to Rent,

The works recently used by us as a Hollow-ware Foundry. They have capacity for 70 or 75 moulders, a good cupola capable of melting 80 tons easily, an engine, with shafting, machinery, elevator and root blower, sufficient mounting and storerooms, carpenter shop, polishing and plating rooms, and all adjuncts necessary for economy. A railroad, connecting with all the roads centering in the city, runs contiguous to the works, the Detroit river being a half block away, affording most excellent shipping and receiving facilities. The works are in a cheap iron and fuel market; labor is reasonable and generally plentiful. For a stove manufactory they are specially adapted. will be sold for partly cash, partly time payments, or let at a moderate rental from January 1st.
Apply to DETROIT IRON & BRASS MFG CO.,
Detroit, Mich.
Or to D. M. THOMAS, Secretary,
Chemung Hollow-ware Works, Elmira, N. Y.

Wanted.

An Experienced Mechanical Draughtsman.

Address, THE BURDEN IRON CO.,
Troy, N. Y.

Wanted.

A BLAST FURNACE FOUNDER.

Address, THE BURDEN IRON CO.,
Troy, N. Y

Wanted.

VERTICAL BORING AND TURNING MILL, new or second hand, to swing 7 to 12 feet. State maker, time of delivery, price, age, condition, and where it can be seen. Address
N. PORTZ & CO.,
Fostoria, Ohio.

Wanted.

Hardware salesman on or before January 1st; an experienced salesman of good address, able to keep up stock; must have some experience in the retail business. To one who is competent and not afraid to work, a liberal salary will be paid. Address, with reference and particulars,
LOUIS HOFFMAN, Vicksburg, Miss.

Wanted.

Two competent salesmen in a wholesale and retail Hardware Store. None but those thoroughly acquainted with the business need apply. Apply by letter, with reference, to
BENEDICT & McCONIHE,
Jacksonville, Florida.

Wanted.

A party to invest, say $3000, in an Iron Mining Company and take position as Secretary and Treasurer, or Superintendent. Address
"BLOOM,"
Office of *The Iron Age*, 220 S. 4th st., Phila., Pa.

Wanted.

By a young man thoroughly posted in Hardware and Metals, the buying agency in this city for some Western or Southern house. Can claim, by long and varied experience in the trade, to be well qualified to act in above capacity. Will furnish the very best of references and give bond, if required. Very favorable terms will be made by the undersigned, who earnestly solicits correspondence. "BUYER," Box 41,
Office of *The Iron Age*, 83 Reade St., New York.

Wanted.

A situation as Founder by a practical man, Coke or Charcoal. Understands Geology, Analysis, and makes all necessary drawings and estimates. Unexceptionable reference.
Address FOUNDER,
Office of *The Iron Age*, 83 Reade St., New York.

WANTED—HARDWARE.

A purchaser for a wholesale Hardware House already established, and doing an excellent business, situated in the city of Cincinnati. The business as a whole or a controlling interest can be obtained. The Great Southern Railroad, leading into the heart of the South and Texas, opens up such an extensive territory that the business can be enlarged as capital and desire may dictate. A satisfactory showing can be made to any parties wishing to consider the purchase. Address, T. T. MOORE.
Office of *The Iron Age*, Cincinnati, O.

WANTED—Situation as Superintendent or Designing Engineer in machine or iron works by a man of 18 years' experience, now holding as similar position. Address
A. B., Box 19,
Office of *The Iron Age*, 83 Reade St., New York.

Special Notices.

For Sale or to Let.

Our present works, the best located in Philadelphia, at Church Street Station, P. R. R., Frankford. Lot 120 by 200 feet. Main buildings of brick, with about 16,000 feet of floor room. Also, brick office, handsomely finished in hard woods, with fire-proof vault. Frame storehouse, 20 by 60 feet. Substantial stone coal bins adjacent to side track. Excellent engine and boiler, 60 horse-power each, now running and in perfect order. Shipments are made to and supplies received from all points at through rates, without cartage. Possession given Jan 1, 1882. This place must be seen to be appreciated. Address
YERKES & PLUMB, Frankford, Phila.

For Sale.

The Little Schuylkill Rolling Mill,

at Milldale, Schuylkill County, Pa., near Port Clinton, on the line of the Philadelphia and Reading Railroad, consisting of a Merchant Bar Mill in complete running order, with a splendid water power sufficient to run the mill two-thirds of the year. Engines, Boilers, Foundry and Machine Shop, with Lathe for turning rolls, and all other appurtenances necessary to commence operation at once. Together with dwellings, stables and large tract of land, to be sold low if applied for soon. For further particulars address or apply to
J. O. RICHARDSON,
No. 232 Dock street, Philadelphia.

For Sale.

INTEREST IN A COKE FURNACE.

A rare chance to buy, with a small amount of money, the one-half or one-third of a small COKE FURNACE, now in successful operation, situated in a central location in Pennsylvania, right on a railroad, and inside the corporate limits of a pleasant town. Plenty of ore and coke to be had. Furnace turning out now 10 to 12 tons of most excellent iron per day. Iron sold ahead of make. Plenty of ore on bank of furnace. Present owner does not live at furnace; is engaged in other business and cannot move to furnace. Would like to sell an interest to some one who would come on and take charge of the business, or send some person to do so. Full particulars and investigation can be had at once by addressing
COKE FURNACE,
Care Am. Iron and Steel Association,
265 S. 4th St., Philadelphia.

For Sale.

Stock of Hardware, Fixtures, and Good Will of the subscribers, in the city of Norwich, Conn.

Only one other hardware store. Population 21,000.

FULLER & PARISH.

For Sale.

One 20-inch Engine, one 100-horse Locomotive Boiler; two large Pulleys, 30-inch face; a 20-inch Rubber Belt, &c. All in good order, and will be sold for less than value to make room for larger. Can be seen running at
AKRON RUBBER WORKS,
Akron, Ohio.

For Sale.

Ten Double Acting Power Punching Presses, A1 order. Eight Single Acting Power Punching Presses, A1 order. Most of the double acting presses are the No. 3 Waterbury Press; the single acting, No. 2. One large Bliss & Williams Punching Press. One hundred and twenty-seven Foot Presses in A1 order, most of them square slides. Address, THE GEORGE PLACE MACHINERY AGENCY, 122 Chambers and 103 Reade sts., N. Y.

For Sale.

Stock of hardware, stoves and implements, and store furniture, in one of the best towns in Kansas
Address HARDWARE,
Box 366, Salina, Kansas.

For Sale.

Just what every machine shop, foundry, rolling mill, engine room, &c., requires this season of the year is the
Dangler Vapor Illuminating Torch,
a brilliant, economical and convenient light.
Sample torch sent on receipt of $3. See cut in this issue of *Iron Age*. Address
DANGLER VAPOR S. & REFINING CO.,
Cleveland, Ohio.

For Sale.

The Industrial Works of Shamokin, owned and successfully carried on for a number of years by the late Wm. Brown, deceased, consisting of Foundry and Machine Shop, and a large stock of Patterns regarded as part of the property. Boiler Shop, Blacksmith Shop and Factory for the manufacture of heavy coal screens. Well located in the borough of Shamokin, Pa., with the best facilities for shipping by rail, and surrounded by a district contributing all the work that a shop of that kind can possibly turn out. The works are now running, but in a very short time possession can be given. Easy terms of payment are offered to suit a purchaser of limited capital.
Offered for sale by
WM. McILVAIN & SONS,
Reading, Pa.

For Sale.

Hardware Stock and Business.

Located in one of the best towns of Northeastern Pennsylvania. Stock clean and well assorted, suited to the requirements of the trade where located. Business of 30 years' standing. For terms and full particulars apply to
JAMES S. KUHN, Towanda, Pa.

For Sale or to Rent.

A large brick Foundry and Machine Shops for sale or to rent on North River, at this place. Terms accommodating. Address
JOHN W. F. ALLEMONG,
BRIDGEWATER,
Rockingham County, Virginia.

For Sale.

A quantity of Coal Oil Vapor Torches. These are of the best make. Manufactured by the Vapor Oil Stove Co. They give a clear white flame of great power. Are safe, durable, and economical, and are just the thing for foundrymen and machinists. Sample torch, $3.
Address T. R. LOOMES,
32 Marion St., Cleveland, O.

EXPERIENCED ROLL TURNER AND MACHINIST desires another situation, not being satisfied with his present one. Address
ROLL TURNER,
Office of *The Iron Age*, 220 S. 4th St., Phila., Pa.

Special Notices.

Bolt, Nut and Washer Machinery For Sale.

Six 1¼-in. double-head Bolt Cutters with automatic stop, and powerfully geared, and particularly adapted to cutting Track Bolts or large quantities of Bolts of various sizes.

Four ¾-in. double-head Bolt Cutters, the same as are used in all large bolt factories.

Two 4-spindle and One 6-spindle Nut Tappers.

Two No. 2 Washer Machines for making all washers to ¾ in.

One No. 1 Washer Machine for washers up to 2 in. Bolt Size.

Two Bolt Headers with latest and best improvements for all bolts to 1 in. Strongest heads and largest variety of any machine in use.

One No. 1 Nut Machine for 1½ in. Nuts, hexagon or square.

Two No. 2 Nut Machines for No. 1 Nuts, and all under.

Two No. 3 Nut Machines for ½ in. Nuts, and all smaller; 1000 lbs. of ⅝ in. Nuts made per day.

YORK & SMITH,
Cleveland, Ohio.

For Sale.

SECOND-HAND
DROPS AND LIFTERS
BEECHER & PECK,
Lock Box 122, New Haven, Conn.

For Sale.

Two Corliss Condensing Beam Engines,

32 in. x 72 in. cylinders. Address,
THE HARTFORD ENGINEERING CO.,
Hartford, Conn.

For Sale.

A Job Lot of
SOLID STEEL PLOWS,
LEFT HAND. Prices very low.
COLLINS & CO.,
212 Water Street, New York.

For Sale.

Mount Vernon Iron Works, Virginia.

Located in Augusta and Rockingham Counties.

This property consists of over 30,000 acres land, on which are valuable deposits and mines of ore and tracts of timber. The improvements consist of one forge with five fires and run-out, with Shenandoah river for power; mansion house, stable, dwellings, &c. One furnace with hight of 34 feet and bosh 8½ feet. The forge is within one mile of Weyers Cave station on Shenandoah Valley Railroad, 17 miles from Waynesboro. This road, recently completed, runs between forge and furnace.
Apply to P. O. BOX 285,
Baltimore, Md.

Iron Mines For Sale.

The Magnetic Ore Mines of the Glendower Company, 32 to 34 miles from Kingston, Canada, 30 of which is by rail. Ten thousand tons, unsurpassed in purity and per centage, have been shipped. Recent openings establish an extensive ore formation on 400 acres. Shipping facilities by Lake to Fairhaven, Cleveland and Chicago, ensure moderate freights. Liberal terms will be made.
Apply to JOSEPH BAWDEN,
Nov. 15, 1881. Kingston, Canada.

For Sale.

One Chapin Rivet Machine, for making rivets cold. Has been used but little.
Address LOCK BOX 1459.
Pittsburgh, Pa.

For Sale.

A full stock of General Hardware and Tinners' outfit; new store building, warehouse and stables, with the land on which they stand, at Millbrook, Mich. A flourishing business in successful operation, entirely free from competition. Or a much larger stock of the same in rented buildings, mostly in Stanton, Mich. Terms cash, or good bankable paper. Inquire of
J. RICHARDS & SONS,
Stanton, Michigan.

FOR SALE.

Two blowing cylinders 40 x 60 inches, with top manifold and connections. Engine 12 x 36 inches. Crank shaft with gearing; fly-wheel 12 feet; belt wheel 9 feet, 16 inch face. One saw rigged for cutting off has 15 foot cog-geared carriage, bed plate 15 x 2 feet x 2½ inches thick. One saw with rigging for slitting iron, with carriage and bed.
Will sell the above separately or together at a bargain. Address,
YORK ROLLING MILL, York, Pa.

FOR SALE LOW.—ENGINE.

A Vertical High-Pressure Steam Engine, complete. Cylinder, 24 in. by 48 in. Built by A. J. Sweeney & Son. Can be seen in daily use at our nail factory.
LA BELLE IRON WORKS,
Wheeling, West Va.

FIRST-CLASS ROLLING MILL,

having best Machinery, and Siemens' Gas Furnaces, for making Iron or Steel Rails, or Bar Iron. Has 15 Upright Engines, aggregating 2500 H. P.; 23 Boilers, four Gas Furnaces, six Puddling, two Scrap Iron, and one Old Rail Furnaces, with all necessary machinery for turning out 25,000 tons rails per annum. Well located on river and railroad with regard to Fuel, Iron and a Market. Rail Mill can be finished ready for work in 30 days, and Puddling Mill in 60 days. Machinery all new and in good order.
☞ *Will Sell Half or Whole Interest, or Lease on Favorable Terms.*
S. B. SHAW & CO.,
St. Louis, Mo.

FOR SALE.—Steam Engine in good order, practically new, large fly-wheel, cylinder, 16 x 24. Also large upright boiler and attachment. Shafting, pulleys, circular saws, belting, &c., &c.
WM. IRWIN,
152 B'way, N. Y.

MALLEABLE IRON.—Situation wanted as foreman, by a man of twelve years' experience in that capacity, who is thoroughly acquainted with the manufacture of Malleable Iron from air furnaces in all its details.
Understands building furnaces and ovens.
Address J. F. W.,
Office of *The Iron Age*, 83 Reade St., New York.

Special Notices.

JOB LOT.

ELEY BROTHERS'
GENUINE BLUE CARTRIDGE CASES,
Twelve Gauge.

The best paper shell in the market. For sale cheap. Supply limited.
ALFRED FIELD & CO.,
93 Chambers St., N. Y.

AN EXPERIENCED HARDWARE

Salesman would like an engagement to travel South or West for a few months after January 1st for a reliable Hardware or Cutlery Company. Salary not so much an object as to avoid a cold Northern winter. Address HARDWARE,
Revere House, Boston, Mass.

HEAVY IRON WORKS WANTED.

An Eastern Manufacturing Company, doing a profitable business in heavy wrought iron structures, the manufacture and sale of which they control for the United States and Canada, wish to establish additional work, located in the West, South, Pacific Coast and Province of Ontario. Must have first-class freight advantages for receiving rolled structural and merchant iron. Address
WM. O. DOUGLAS, Binghamton, N. Y.

MINING ENGINEER WANTED

to take charge of one or more Hematite Ore Mines, in a healthy location. Must be experienced, of good habits, and thoroughly acquainted with mining in levels and on surface. State full particulars as to age, experience, and where formerly operating. Address,
MINING ENGINEER, Box 25,
Office of *The Iron Age*, 83 Reade st., New York.

Party Owning Rolling Mill,

Well located and doing good business, wants partner with $10,000 capital to increase the business, which will pay largely. Best references given and required.
Address ROLLING MILL,
Office of *The Iron Age*, 83 Reade St., New York.

ELECTRIC LAMP.

For sale, United States Patent No. 245,918, granted for an Electric Lamp, Aug. 23, 1881.
Address
"ELECTRIC,"
Office of *The Iron Age*, 220 S. 4th st., Phila., Pa.

Hardware Business for Sale,

In thriving village of 5000 inhabitants in Southern New York. Three lines of railroads to New York. Doing about $50,000 business a year. Trade could easily be increased to $70,000 by putting in stock bar iron, steel, &c. Satisfactory reasons furnished for selling. Please address
"C.,"
Office of *The Iron Age*, 83 Reade St., New York.

Copartnership Dissolution.

NOTICE is hereby given that by the death of the junior partner, Mr. Nathan Anthony, the firm of BRADFORD & ANTHONY is this day dissolved.
The affairs of the firm will be settled by the undersigned, the sole surviving partner.
MARTIN L. BRADFORD.
Boston, June 12, 1881.
All communications in regard to the affairs of the late firm should be addressed to
BRADFORD & ANTHONY, Boston, Mass.

MARTIN L. BRADFORD hereby gives notice that he will continue his business under the name of "BRADFORD & ANTHONY."
The estate of the late Nathan Anthony is to be in no way interested in the future business, whether conducted under the name of Bradford & Anthony or otherwise.
All business communications should be addressed to
BRADFORD & ANTHONY,
274 Washington St., Boston,
Importers, Manufacturers' Agents and Dealers in Cutlery, Fishing Tackle, Skates.
See advertisement first issue of each month.

HOW TO
KEEP BOILERS CLEAN,
And Other Valuable Information.

A book sent free to engineers and steam users by
JAMES F. HOTCHKISS,
84 John St., NEW YORK.

The Sherman Process Co.

9 Pemberton Square, Boston, Mass.,
Issue Licenses to use the Process for the Manufacture of Iron and Steel
In the Bessemer Converter, Crucible, Siemens-Martin, Puddling, Blast and Cupola Furnaces.
The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working.
See page 17 of *The Iron Age* of Oct. 25th, 1877.

NOTICE.

TO THE HARDWARE TRADE,

Retail and Wholesale.

Before buying, send to me for quotations. Will give special figures lower than market rates on a large line of Shelf Hardware and Tinware.

A. W. WHEELER,
141 Lake St., Chicago.

BUSINESS CHANCE.

A first-class Retail Hardware Store in the vicinity of New York City for sale on reasonable terms. One who desires to acquire a business can be employed for a month or two to get acquainted with the entire place.
Address E. H.,
P. O. Box 892, N. Y.

Bissell & Welles,

Wholesale Hardware Auctioneers
83 Chambers and 65 Reade Sts., N. Y.
Sales held weekly for the trade. Consignments solicited. We refer to the leading Manufacturers and Importers.

Sanderson Bros Steel Co.

Forty shares for sale at a discount.
EDWARD FRITH & SON,
241 Pearl street, New York.

Trade Report.

Office of THE IRON AGE,
TUESDAY EVENING, NOV. 22, 1881.

In consequence of the national holiday of Thanksgiving falling upon our publication day, we this week go to press a day earlier than usual.

Wall street markets during the week under review have been more or less disturbed by bank difficulties, actual or apprehended, and questions respecting the possible effect upon the sources of money supply in New York. The Tradesmen's Bank of this city, after examination, was pronounced solvent, but quickly following came rumors of bank failures in Boston. On Friday the Pacific National of Boston closed its doors, and the Central National, also of Boston, was compelled temporarily to suspend, on account of entanglements with the former. On Saturday the bears took advantage of current rumors to depress stocks, and there was a decline ranging from 1 @ 5½ % on specialties, and ¼ @ ⅞ on the general list. The money market on Monday was in a feverish condition, under apprehension of heavy calls from Boston, and the tendency was toward stringency. Prices of stocks at the call fell off by reasons of activity in money, and the market was irregular. To-day accounts from Boston are favorable, but confidence is not fully restored. Money was active until near the close, and few brokers were accommodated for less than 6 % and commission.

The posted rates for bankers' sterling were on Monday reduced to $4.81 for 60 day, and $4.85 for sight. The market for foreign exchange continues dull. The rates for commercial paper are nominal. First class commands 6 %, and only the highest grades are in demand. State bonds to-day were quiet, and generally lower.

The Treasury has given notice to the Assistant Treasurer at New York that, owing to the failure of the Government to get the $2,000,000 3½ per cents ordered to be purchased for two weeks past, he may purchase $4,000,000 of such bonds any day before next Wednesday (to-morrow), but it is not probable that the cash surplus in the Government vaults will be materially reduced by this method. It is thought by many that Secretary Folger will issue a call for a considerable amount of extended 6s later in the week. On the other hand, it may reasonably be doubted whether any of these bonds are likely to be offered, so long as the holders can get a better price in the street. Railroad bonds are irregular, and generally lower. State bonds are lower, Tennessee 6s, new series, declined 6 %. There is nothing further in relation to the railroad war.

It is reported on apparently good authority that, owing to dissatisfaction with the stock exchange management in regard to certain stocks, a new exchange is in contemplation, backed by prominent bankers in our principal cities. The names of Gould, Field, Russel Sage and others well known are mentioned in connection with the enterprise.

In general trade the volume of business diminishes as the season draws nearer to a close, and in some commodities a shrinkage of prices is noticeable. The export trade, however, continues blocked by speculative combinations. A stringent money market would have at least one good effect in compelling the "operators" to unload.

The bank return for the week shows a loss of $519,000 in reserve, which now stands at $2,453,575, against $1,941,650 at this time last year, and $6,417,575 at the corresponding period in 1879. The loans show a gain this week of $2,058,500.

The importations of specie and bullion at this port during the week ending Nov. 18 were $251,341, consisting of $226,091 in gold and $25,250 in silver, as against a total of $2,459,649 for the week ending Nov. 20, last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	Since January 1—	
	1881.	1880.
Gold	$51,088,237	$50,053,733
Silver	2,522,316	5,027,638
Total	$53,610,553	$55,061,371
	Since August 1—	
	1881.	1880.
Gold	$22,466,978	$48,079,366
Silver	768,387	1,813,132
Total	$23,232,365	$49,892,498

The following is an analysis of the bank totals of this week compared with that of last week:

	Nov. 12.	Nov. 19.	Comparison.
Loans	$314,123,800	$315,182,300	Inc. $2,058,500
Specie	60,788,000	59,949,700	Dec. 839,300
Legal t'd'rs	14,853,600	15,276,000	Inc. 423,000
Tot. reserve	75,641,900	75,225,700	Dec. 416,200
Deposits	293,677,300	294,088,500	Inc. 411,200
Reserve required	72,669,325	72,772,125	Inc. 102,800
Surplus	2,972,575	2,453,575	Dec. 519,000
Circulation	20,043,100	19,962,400	Dec. 80,700

Government bonds at the close were quoted as follows:

	Bid.	Asked
U. S. 4½'s 1891 registered	112½	112¾
U. S. 4½'s 1891 coupon	113⅜	113¾
U. S. 4's 1907 registered	116¾	117
U. S. 4's 1907 coupon	116¾	117
U. S. Currency 6s 1895	130	—
U. S. Currency 6s 1896	130½	--
U. S. Currency 6s 1897	131	—
U. S. Currency 6s 1898	131½	
U. S. Currency 6s 1899	132½	—
Sixes continued	101¼	101¼
Fives continued	102	102⅛

MINING STOCKS.

The following are the closing quotations for mining stocks:

	Bid.	Asked.
Alice	5.00	5.50
Alta Mont		1.75
Belle Isle		.24
Bodie		5.12½
Bulwer		2.50
Bassick	10.00	13.00
Bull Dom	50	53
Boulder	6	
Boston C		30
Big Pittsburgh		80
Bradshaw	49	53
Calaveras	9	11
California	50	60
Climax	90	95
Consolidated Imperial		15
Consolidated Virginia		2.00
Chrysolite	5.62½	5.75
Cent. Ariz		1.40
Dahlonega	4	5
Dunderberg	68	
Dunkin		49
Eureka C		17.50
Findley	20	25
Fa. D-Smet	7.75	8.50
Geodshaw		50
Great Eastern	9	10
Gold Str		50
Hukill	56	62
Horn Silver	16.37½	16.75
Hibernia	27	28
Independence		16
Iron Silver	1.95	2.00
Lacrosse	27	28
Leadville		1.45
L. Chief		1.05
Moose		83
Miner Boy	28	30
Navajo	38	40
N. Bell I		30
Ori. and Mil	40	42
Rappah'k	13	
Robinson	8.62½	9.87½
R. Sun	70	
Red Eleph		15
S. Nevada	10.00	
Silver Cliff		2.35
Sutro		1.10
Spr'g Va!		3.75
Stormont		2.00
South Pacific	8.50	9.12½
St. L. No. 1 and 4	33	
St. L. 2 and 3	1.15	1.90
Tuscarora		18
Unadilla	7	

GENERAL HARDWARE.

The tone of the market continues strong, and the prolonged activity is remarkable. The demand seems to be void of the slightest element of speculation, and the only drawback to a much larger business than is doing is found in the scarcity of goods and the inability of manufacturers to catch up with their orders. Very few changes in prices are announced during the week, but it will be seen from the following that the upward tendency to which we have of late frequently referred, still prevails.

The demand for foreign Hardware is large, when the season is considered, and goods suited to the requirements of the holiday trade are moving freely. A cable dispatch received yesterday reports an advance in the price of Peter Wright's Anvils, but the particulars are not known, and, in the meantime, the price here is advanced ¼ cent per pound. Hermann Boker & Co. have just received a large invoice of Peugeot's Horse Clippers and a new line of Razors styled "Garfield Memorial Razor," on the blade of which is etched a likeness of the late President. They have advanced the price of their "Trenton" anvils ¼ cent per pound. We quote Peter Wright's Anvils, 10¼¢ @ 11¼¢, and "Trenton," 10¼¢.

The American Vise and Tool Association held a meeting during the week, at which quotations of their specialties were withdrawn. Another meeting will be held in a few days, when it is expected that values will be adjusted in conformity with the increased cost of material and labor.

The demand for Nails has fallen off somewhat, although there is still a fair amount of business doing. There is no change to note in the tone of the market, and values are firm. We quote 10d. to 60d., $3.30 @ $3.40, net, according to quantity. The export demand during the week was fair, and we hear of considerable inquiry.

The manufacturers of Wrought Iron Square and Barrel Bolts have advanced their prices. We give below the prices adopted by Sargent & Co. and the Stanley Works for these goods:

SARGENT & CO.

Page in Catalogue.		Dis. per cent.
68, Wrought Square Bolts,	No. 305	55
68a, " "	Nos. 303, 304	55
69, " "	Nos. 306, 307, 308	55
72, 73, Wrought Barrel Bolts		55

Ten per cent. extra for prompt cash.

The No. 12 Gravity Locking Blind Hinges, manufactured by Sargent & Co., have been advanced to 70 per cent. and 10 per cent. cash.

Page in 1879 Catalogue.	STANLEY WORKS.	Discount per cent.
220-222,	Barrel Bolts, 1078-1080, 1082, 1084, 1086	55&10
222-224,	Square Bolts, 1088-1090, 1092, 1094, 1096, 1098	55&10

The following joint circular is in press and will be issued to-morrow:

NEW YORK, November 23, 1881.

To the Trade: From this date we are instructed to quote Coes' Genuine Screw Wrenches of either make at 40 and 10 per cent. discount from list. Mechanics' Wrenches made by L. Coes & Co., and similar quality by A. G. Coes & Co., will continue to rate at 10 per cent. less than the "Genuine."

DURRIE & MCCARTY,
Agents for L. Coes & Co.
GRAHAM & HAINES,
Agents for A. G. Coes & Co.

BRITISH IRON MARKET.

[*Special Report by Cable to The Iron Age.*]

LONDON, Nov. 22, 1881.

Scotch Pig.—The upward movement of prices received a check during the week, and prices fell off a little, but have since recovered and are now advancing. As compared with last Wednesday, Gartsherrie is 1/ higher, and Coltness and Eglinton 6d. The following are to-day's quotations:

Gartsherrie, alongside, Glasgow	60/
Coltness " "	60/
Glengarnock " Ardrossan	52/6
Eglinton " "	52/

Lighterage from Ardrossan to Glasgow is 2/ @ 2/6 per ton.

Bessemer Pig.—There is no change to note, prices ruling steady, with transactions large. Lots of equal portions Nos. 1, 2 and 3, unchanged, at 61/6.

Manufactured Iron.—Prices are firm, with a large business doing. We quote Best Staffordshire Bars at £7. 10/ @ £8.

Steel Rails.—The demand is increasing and prices are firm. Quotations of ordinary sections are unchanged, viz.: £6. 5/ @ £6. 10/.

Iron Rails.—The market remains quiet and prices steady. Welsh are quoted £5. 10/ @ £5. 15/.

Old Rails.—There is but a small quantity offering, and transactions are light. Old Tees, c. i. f. United States ports, are quoted £4. 10/.

Scrap.—But little doing

Freights.—Steam freights from Glasgow to New York, 12/6 @ 15/.

IRON.

American Pig.—Although in Pig Iron the transactions reported are not large, there is considerable inquiry, and the tone of the market gains rather than loses strength. Of some brands, favorites in this market, there seems to be a scarcity, and occasional instances are reported where orders are declined even when a price is offered considerably above current quotations. No sales worthy of mention have come to our notice during the week, and we continue to quote: Foundry No. 1, $25 @ $26; Foundry No. 2 X, $23 @ $23.50, and Gray Forge, $22.50.

Scotch Pig.—Considerable business in foreign Iron has transpired during the week, included in which we note sales in lots of 1500 tons Glengarnock at $24 @ $25, and 400 tons Coltness at our quotations. The agents for the sale of Gartsherrie and Eglinton brands inform us that they now hold Gartsherrie at $25 for parcels from wharf or to arrive and $26 from yard; and Eglinton, of which the stock is very small and there is none on the way, $23 from yard. We quote: Eglinton, $23; Carnbroe, $24; Coltness, $26 @ $26.50; Glengarnock, $24.50 @ $25; and Gartsherrie, $25 @ $26.

Sales are reported of 300 tons Redcar No. 3 at $22, and 100 tons of another grade of Middlesboro' Iron at $21.75.

Rails.—We hear of renewed activity in the demand for railroad equipment and negotiations pending for large parcels of Steel Rails. Sales are reported since our last writing of about 14,000 tons Steel Rails and 6000 tons Iron Rails, the latter for delivery in the West, but particulars are withheld. We quote Steel, at mill, 1882 delivery, $60, and Iron, at mill, $48 @ $50 for ordinary sections.

Old Rails.—There is not much doing in Old Material and but little inquiry. Holders' views are as a rule higher than consumers are willing to pay, but as the stocks are considerably reduced and said to be concentrated in able hands, it would be difficult to place an order at any concession from our quotations. Sales are reported of a few small parcels T's at $29. We quote T's, $29 @ $29.25, and Double Heads, $31.50 @ $32.

Scrap.—Sales are announced of 600 tons No. 1 Wrought, ex ship and to arrive, part at $31. Prime Selected, from yard, is in short supply and is quoted $32.50.

Manufactured Iron.—The demand for finished Iron is not quite as urgent as it has been, still the business is active when the season is considered, and the tone of the market is strong. We quote Refined Bar, from store, 2.9¢.

METALS.

Copper.—Sales for the week amount to 400,000 to 500,000 pounds Lake Superior at 18¼¢ @ 18½¢. Now 18½¢ is offered, and 19¢ asked. Baltimore is worth, nominally, 18½¢. There is a better demand, and more confidence shown both by manufacturers and dealers. Consumption is going on in this country at an enormous rate for the moment, at the rate of 70,000,000 pounds per annum; hence the increasing production West of the Mississippi is less threatening than it would otherwise appear. It is believed that production in that section of the United States will figure up in 1882 between 20,000,000 and 25,000,000 pounds. This would, however, only be in keeping with our current absorption, if the latter goes on as it has lately done, and there is no reason why it should not, for there are now many additional elements of consumption, the result of modern invention, not thought of formerly, especially in the electrical branch. At the same time the falling off in Chilian production this year is remarkable, the indication being that it will be 10,000 tons less than in 1880; in other words, from being a producer of 45,000 tons annually on an average, Chili declines all of a sudden to 35,000 tons per annum, by reason of a curtailment of hands through the war on the Pacific, of which the end is not yet apparent. As a check on this Chilian deficiency, there is Rio Tinto in Andalusia prospering more than ever as a copper producer, to judge from the splendid dividends it pays, but it is doubtful whether Rio Tinto will turn out an excess to make good the 10,000 tons of Chilian decrease. It would indeed be astonishing if it did. On taking, therefore, into consideration all the "pros" and "cons," it seems to us that Copper is in a sound condition, so far as we can judge at the present writing. At London there has been an advance of £2 since our last, Chili Bars rising to £66, and Best Selected to £72. This improvement we are slowly following. No futures are obtainable; producers decline to name a price. "London, Nov. 5.—This market has for the most part remained strong, and a fair business, taken on the whole, has been transacted. Prices have continued to show a steady upward tendency, but at the same time there has been an absence of any sharp rise. This steady, gradual improvement in prices is most satisfactory, because it is more likely to give a more lengthened support to the market than if prices were to rise speedily, while at the same time there is in consequence little chance of any serious reaction. As time progresses the prospects of this trade certainly appear to become more and more encouraging. The business doing is chiefly for *bona fide* account, as the repeated good deliveries testify, and as supplies are kept limited and within the requirements of the trade, statistics show again a further reduction in the total visible stocks. Manufactures are quoted as under: Pit and Hot-rolled Flat Bottoms, 29¢ per pound; Cold-rolled Flat Bottoms and Pit Bottoms, with flange cut, 30¢; Braziers, 28¢ @ 34¢, as to size and weight; Circles, 31¢ @ 34¢; Sheets, 28¢ @ 31¢; Sheathing, 26¢, and Bolt Copper, 28¢.

Tin.—Our market has advanced under the influence of speculative purchases for foreign account, about 250 tons selling at 21⅞¢ @ 22¼¢ since our last. The present market price for Straits Tin, large lines, is 22¼¢ @ 22½¢; Australian, 22⅜¢; Billiton, 22½¢, and Lamb and Flag English, 23¢ @ 23½¢, the latter being scarce and cabled £111 from London. For Straits 22¼¢ was paid this morning, but the cable reported at the time £107, since when it has come £105. 10/. About 1000 tons of Tin bought here for European account will now be shipped. The Singapore market is at a parity of 24¢ here. Shipments from the Straits during the first half of the current month have been 300 tons to England, and none to the United States. "London, Nov. 5.—During the week now nearly closing this market has continued for the most part steady, and prices have been sustained, but no advances worthy of note have been made. Buyers, perhaps, to some extent are reluctant to pay the present enhanced rates; nevertheless, the market is well supported by statistics again showing a further reduction in the total visible stock. Although possibly purchasers who buy for speculative account are in some cases slow to pay the present high figures, yet as an evidence that consumers do not hold off the market through this cause, reference need only be made to the deliveries of last month, which were again on an even still larger scale than in the previous month; while again, if reference be made to the deliveries for the whole of this year, the totals compare very well with any for the few previous years." *Tin Plates.*—The market here has been active in Coke Tin, of which we have a short supply, and quiet in Charcoals. We quote at the close, large lines, ordinary brands, per box: Charcoal Bright, $5.87½ @ $6.25; ditto Ternes, $5.25 @ $5.37½; Coke Tin, $5.37½ @ $5.50; and ditto Ternes, $5 @ $5.12½. In England there is quite an excitement in Tin Plates, in view of decreasing stocks and the increased value of the raw material. Thus, Coke Tin has risen to 17/6, while Charcoals are worth 19/ @ 21/. As to these higher prices the higher freight from the other side has to be added, the firmness here is easily explained.

Lead.—Sales for the week sum up some 200 tons, at 5¢ for Common Domestic, at which the market is very steady. Newark is scarce and, in a small way, brings $5.15 @ $5.20. Refined may be quoted $5.20 @ $5.25. St. Louis quotes Refined 4⅞¢ @ 5¢, and Common, 4¾¢, to which a 29¢ freight has to be added. Europe cables to-day a firm market. It costs, at present, $5.30 to lay down Lead from there. "London, Nov. 5.—There is very little change in the state of this market; prices, if anything, are a shade easier, but not much business is doing." We quote manufactures as follows: Sheet Lead, 8¢ per lb; Lead Pipe, 7½¢; Tin-lined ditto, 15¢, and Block Tin ditto, 35¢, less the usual discount.

Spelter and Zinc.—Common Domestic Spelter is exceedingly scarce, as heretofore; this is the main cause why so little transpires in it at present. It cannot be had under 5⅞¢. In Silesian nothing has been done; we quote the same, nominally, 6¢. London cables a firmer market. Breslau announces per mail, Nov. 7, a very firm one too. *Sheet Zinc* has become quite scarce, and is now quoted 7¾¢ @ 8¼¢. "London, Nov. 5.—A large business has been done this week, and prices are firm at £17. 7/6 @ £17. 12/6 for ordinary brands."

Antimony.—Trade in this metal is fair. Very little Cookson will be forthcoming; the price, in view of the steady demand for this brand, has consequently been advanced for the same to 14½¢ for cash lots, and 15¢ for jobbing ditto. American continues to sell at 13¢.

FOREIGN TRADE MOVEMENTS.

The following is a summary of the foreign trade movements for the past week:

IMPORTS.

For the week ended November 18:

	1879.	1880.	1881.
Total	$8,140,956	$9,687,855	$8,645,768
Prev. reported	281,294,298	422,031,297	383,062,444
Since Jan. 1	$289,435,254	$432,319,152	$391,708,212

Included in the imports for the week ended November 18, were articles valued as follows:

	Quantity.	Value.
Anvils	125	$561
Brass goods	37	4,341
Bronzes	33	12,332
Chains and anchors	15	1,265
Clocks	60	9,814
Copper		937
Cutlery	120	36,050
Pins	2	771
Gas fixtures	1	526
Guns	243	37,063
Hardware	13	2,081
Iron, pig, tons	3,944	77,693
Iron, sheet, tons	135	7,733
Iron ore, tons	2,944	8,191
Iron, other, tons	2,425	54,575
Lead, pigs	3,022	13,787
Machinery	95	18,782
Metal goods	255	20,899
Nails	1	389
Needles	18	4,957
Nickel	15	2,849
Old metal	--	3,834
Platina	3	2,000
Plateware	2	162
Percussion caps	14	2,876
Saddlery	27	2,167
Steel	45,532	850,982
Spelter	1,134,629	44,314
Silverware	6	181
Tin, boxes	47,834	828,763
Tin, 2,300 slabs	130,407	26,821
Toasles	10	516
Wire	261	2,713
Zinc	231,691	5,838

The following are the imports of leading articles, compared with previous dates:

	For the week.	46 weeks of 1881.	Same time 1880.
Cutlery, pkgs	110	6,156	7,734
Hardware, pkgs	13	888	1,164
Iron, R. R., bars	...	338,376	357,075
Lead, pigs	3,022	35,696	42,512
Steel, pkgs	45,532	1,049,708	547,318
Tin, boxes	47,834	1,430,867	1,500,082
Tin slabs, lbs	130,407	15,731,477	24,463,467

EXPORTS OF SPECIE.

For the week ended November 19:

Total	$46,800
Previously reported	10,023,139
Total since January 1, 1881	$10,070,939
Same time in 1880	7,811,530
Same time in 1879	13,575,574
Same time in 1878	11,533,494
Same time in 1877	24,272,883
Same time in 1876	42,277,315
Same time in 1875	60,028,400
Same time in 1874	48,463,315
Same time in 1873	46,040,508
Same time in 1872	57,004,509

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending Nov 21, 1881:

Hardware.

Boker Hermann & Co.
Hardware, cks., 19
Iron chains, bdls., 37
Guns and cutlery, pkgs., 59
Brown Wm.
Box, 1
Clark G. A. & Bro.
Mach'y, cs., 34
Drexel, Morgan & Co.
Cases, 14
Furth Wm. Son & Co.
Mach'y, cs., 7
Field Alfred & Co.
Chains, cks., 51
Keg, 1
Anvils, 543
Mach'y, cs., 2
Cases, 5
Casks, 2
Packages, 13
Folsom H. & D.
Arms, cs., 28
Grant & Co.
Mach'y, cs., 1
Godfrey Chas. T.
Arms, cs., 6
Godfrey Jas. W.
Arms, cs., 2
Hartley & Graham,
Arms, cs., 6
Hodgkins & Haight,
Arms, cs., 2
Jordan & Black,
Mach'y, cs., 2
Junge F. W. & Co.
Gun barrels, cs., 12
Gun butt ends, cs., 1
Luyties Bros.
Machine, case, 1
Markt & Co.
Cases, 19
Merchants' Dispatch Co.
Mach'y, cs., 2
Anvils, 51
Vises, cks., 2
Arms, cs., 11
Casks, 2
Cases, 7
Moss F. W.
Files, csk., 4
Anvil, 1
Moore's Sons J. P.
Cases, 2
Moorris L. W.
Arms, case, 1
McCoy & Sanders,
Casks, 2
Levers, bdls., 3
Jim crows, 18
Phelps, Dodge & Co.
Mach'y, pkgs., 12
Schoverling, Daly & Gales,
Mdse., cs., 23
Schuyler & Duane,
Arms, cs., 4
Smith Geo.
Arms, cs., 4
Squires H.
Arms, cs., 3
Taylor Thos.
Mdse., cs., 1
Valencia J. J. & Co.
Guns, cs., 4
Ward Ashbe,
Mdse., cs., 13
Windmuller & Roelker,
Arms, cs., 4
Weibusch, Hilger & Co.
Mdse., cs., 3
Witte John G. & Bro.
Cutlery, cs., 5
Guns, cs., 16
Order,
Guns, cs., 4
Ironware, cks., 2
Ironware, cs., 8
Gun barrels, cs., 3

Iron.

Baring Bros. & Co.
Wire rods, coils, 704
Bars, 2033
Bruce & Cook,
Sheet wire, bdls., 850
Brown J. B.
Old iron, lot.
Old iron, hhds., 3
Brown Bros.
Wire rods, bdls., 5155
Wire rods, pgs., 1498
Coddington T. B. & Co.
Sheet iron, cs., 81
Sheet iron, bdls., 297
Crocker Bros.
Pig, tons, 1000
Drexel, Morgan & Co.
Ore, tons, 466¾
Dickerson, Van Dusen & Co.
Sheet iron, bdls., 155
Duval H. R.
Forgings for axles, 100
Elliott, Son & Co.
Ore, lot.
Field C. de P.
Pig, tons, 200
Great Western Dispatch Co.
Tubes, 1013
Irwin R. & Co.
Pig, tons, 100
Johnson John & Co.
Ironwork, pgs., 177
Lang W. Bailey,
Lowmoor iron, bags, 460
Lowmoor iron, bdls, 30
Plates, 2
Lee Jas. & Co.
Pig, tons, 400
Lundberg Gust.
Bars, 2484
McComb J. J.
Cotton ties, bdls., 1007
Milliken & Smith,
Wire rods, bdls., 702
Naylor, Benzon & Co.
Bars, 4554
Rods, coils, 1678
Parker A. B.
Bess. wire rods, tons, 327
Phelps, Dodge & Co.
Pig, tons, 500
Bessemer pig, tons, 648
Tillotson L. G. & Co.
Galv. wire, lots, 200
Whitney A. R. & Co.
Bars, 2721
Order,
Pig, tons, 672
Spiegel, kilos., 185,250
Spiegel, tons, 139
Castings, cs., 320
Sheet iron, bdls., 308
Sheet iron, pkgs., 1968
Fenc. wire, spools, 301
Bars, 2457
Wire rods, coils, 1377
Wire rods, bdls., 8566
Cases, 6
Casks, 5
Packages, 20
Lowmoor, bdls., 40

Steel.

Abbott Jere. & Co.
Cases, 17
Steel wire, bdls., 195
Baring Bros. & Co.
Cross ends, tons, 249
Brown Bros. & Co.
Blooms, 1180
Brown Wm.
Bundles, 114
Bars, 12
Cases, 3
Carey & Moen
Casks, 53
Drexel, Morgan & Co.
Blooms, 2284
Casks, 2
Cases, 5
Hammacher A. & Co.
Wire, cks., 2
Mayer, Strauss & Co.
Casks, 100
Montgomery & Co.
Wire, cases, 8
Wire, cask, 1
Morton, Bliss & Co.
Blooms, 721
Moss F. W.
Bundles, 92
Bars, 10
Sanderson Bros.
Blooms, 1866
Third Nat. Bank,
Steel rails, 798
Walschied C. Aug.
Bundles, 180
Woodford W. O.
Bundles, 182
Bars, 91
Cases, 14
Order,
Blooms, 5679
Bundles, 126
Rails, 1647
Old spring, tons, 86½
Wire rods, rolls, 108
Old leaf spring, tons, 100
Cases, 16
Old axles, 537
Tires, 63

Metals.

Agostini Jos.
Old cop., cs., 5
Bank British N. Amer.
Plumbago, bbls., 304
Baring Bros. & Co.
Slabs, tin, 481
Brand Jas.
Plumbago, bbls., 96
Bruce & Cook,
Tin plates, bxs., 256
Behm, Meyer & Co.
Tin, slabs, 611
Brown J. B.
Old brass, cs., 2
Brown Bros. & Co.
Plumbago, cks., 1204
Colson Mr.
Composition, cks., 15
Dickerson, Van Dusen & Co.
Tin plates, bxs., 178
Field Alfred & Co.
Per caps, cs., 20
Foote Emerson,
Nickel alloy, bxs., 18
Lamarche & Sons,
Rolled zinc, cks., 28
Maclaine, Fraser & Co.
Tin slabs, 2095
Judge John H
Copper ore, bags, 40
Meyer G. A. & E.
Zinc oxide, bbls., 200
Montell F. T.
Brass, cks., 4
Brass, bbls., 13
Brass, bxs., 2
Copper, box, 1
Copper, bbl., 1
Moore's Sons J. P.
Gun caps, cs., 12
Noel A.
Tin plates, bxs., 4
Phelps, Dodge & Co.
Tin rods, bxs., 21,900
Robertson Jos. & Co.
Zinc oxide, bbls., 200
Stone S. & Co.
Copper rollers, cs., 9
Valencia J. J. & Co.
Shot, cks., 11
Caps, case, 1
Order,
Tin plts., bxs., 27,292
Tin slabs, 208
Tin, ingots, 600
Zinc oxide, bbls., 52
Antimony, cks., 67
Black taggers, bxs., 100
Rolled zinc, cks., 14

EXPORTS

Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the Week ending Nov. 15, 1881:

	Quan.	Val.
Danish West Indies.		
Hdw., pgs....	9	$78
Mf. iron, pkgs	13	107
Copper, shts.	2	56
Plm., gals...	2562	361
Nails, kegs ...	10	38
Ag. imp., pkgs	30	206
Bremen.		
Iron safe.....	1	200
Plm., gals.	662,754	52,275
Mf. iron, pkgs	3	475
Hdw., pkgs...	47	1,245
Ag. imps., case	1	80
Mach'y, cs....	2	150
Cork.		
Plm., gals	165,349	13,600
Dublin.		
Plm., gals.	160,982	12,816
Hamburg.		
Sew. ma., cs.	1498	27,755
Rifles, cs....	3	416
Mfd. iron, pgs	10	604
L. r. goods, case	1	112
Cutlery, case..	1	75
Ag. imp., pkgs	9	665
Pumps, pkgs.	5	250
Hdw., pkgs...	190	2,324
Mach'y, pkgs.	60	16,100
Brass, cs.....	100	9,300
Clocks, pgs...	26	296
Plm., gals	241,478	19,275
Rotterdam.		
Mach'y, case...	1	300
Hdw., pkgs....	12	184
Pumps, pkgs.	4	700
Mf. iron, pkgs.	83	800
Exmouth.		
Naph., gls.	236,101	19,610
Gibraltar.		
Plm., gals.	180,940	19,903
Dutch West Indies.		
Plm., gals...	4366	470
Clocks, bxs...	3	37
Nails, bxs....	2	24
Pumps, pkgs.	1	43
Windlasses...	5	735
Dutch Guiana.		
Hdw., cs.....	12	160
Quicksil., flasks	6	207
Plm., gals....	6290	762
Antwerp.		
Plm., gls.	1,021,224	85,933
Dunkirk.		
Plm., gals.	243,203	19,000
Liverpool.		
Plm., gals.	830,131	72,433
Elec. app., case	1	240
Mach'y, case..	29	2,669
Metal gds, cs.	2	577
Zinc globes, cs	2	600
Skates, cs....	3	537
Brass, pkgs..	195	13,128
C'mp'sit'n, cks	3	214
Mf. iron, pkgs	43	881
Hdw., cs....	84	1,809
Thermom., cs	3	175
Clocks, bxs...	137	3,005
Guns, case	1	53
Ag. imp., pkgs	9	385
R. rollers, cs..	32	719
West Hartlepool.		
Hdw., cs.....	10	3,314
London.		
Plm., gls.	2,365,234	203,114
Mach'y, pkgs.	24	2,780
Hdw., cs.....	381	5,646
Nails, cs....	28	560
Pistols, cs....	3	504
Wire g'ds, cs..	4	81
R. R. cars.....	2	1,950
Cartridges, cs	4	139
Naph., gls.	320,234	27,096
Clocks, pgs...	759	23,525
Mf. iron, pkgs	20	1,043
Sew. ma., cs .	291	5,390
Rifles, cs.....	2	35
Brass g'ds, cs.	57	3,368
Air guns, case.	1	114
Leith.		
Mach'y, cs....	4	500
Hdw., cs.....	6	144
Ag. imp., pge	1	615
Bristol.		
Ag. imp., pkge	1	30
Mf. iron, pkgs.	3	66
Glasgow.		
Clocks, bxs...	155	2,322
Cartridges, cs	200	3,500
Hdw., cs.....	26	840
Pig presses..	3	245
Canada.		
Copper, ckg..	3	753
Anilines.....	2	339
British North American Colonies.		
L. r. goods, cs.	38	370
Iron plates...	2	82
Mach'y, case..	1	100
Plm., gals....	800	122
Sew. ma., cs..	4	40
Hdw., cs.....	14	290
British Guiana.		
Plm., gals....	5000	600
Springs, bdle.	1	25
British East Indies.		
Plm., gals.	264,800	32,000
British Australia.		
Mf. iron, pkgs	47	1,276
Sew. ma., cs..	326	7,893
Hdw., cs.....	385	8,306
Pumps, pkgs.	6	465
Mach'y, pkgs.	22	1,659
Plm., gals.	160,752	24,099
Ag. imp., pkgs	35	474
Clocks, pkgs..	125	1,673
Havre.		
L. r. goods, case	1	275
Plm., gals...	37,114	30,661
Sew. ma., cs..	22	1,705
Mach'y, case..	1	30
Pumps, pkgs.	2	150
French West Indies.		
Sew. ma., cs..	4	100
Mf. iron, pkgs	3	50
Mach'y, case.	1	40
Plm., gals....	7500	865
Bilbao.		
Plm., gals.	140,000	15,400
Seville.		
Plm., gals.	178,420	19,100
Clocks, cs.....	5	330
British West Indies.		
Hdw., cs.....	87	1,288
Mf. iron, pkgs	101	717
Mach'y, pkgs.	4	710
Sew. ma., cs .	4	83
Plm., gals..	19,191	2,395
Nails, kegs....	90	435
Clocks, pgs...	4	102
British Possessions in Africa.		
Cartridges, cs.	11	280
Hdw., pkgs...	213	3,270
Clocks, cs....	5	251
Sew. ma., cs..	1	40
Mach'y, case.	1	75
Hdw., cs.....	2	420
Mexico.		
Hdw., pkgs...	226	5,440
Springs.....	220c	4,825
Nails, kegs....	5	82
Pistols, cs....	4	2,705
Iron safes.....	4	383
Arms, cs.....	48	13,206
Plm., gals....	4050	490
Powder, lbs.	64,080	6,125
Fire engine...	1	170
L chairs, pcs.	24,594	4,577
Valves, bxs...	6	480
Steel, pkgs...	338	1,505
Nails, kegs....	113	372
Mf. iron, pkgs	579	9,103
Sew. ma., cs..	376	4,020
Mach'y, cs....	208	19,501
Pump., pkgs.	4	150
Cars, pkgs...	3604	26,899
Surveying instruments, cs	2	450
Ag. imp., pkgs	36	944
Clocks, pkgs.	47	463
Cartridges, cs	8	223
Cutlery, cs....	25	1,146
L. r goods, case.	1	72
Shot, lbs.....	242	70
Mf. steel, pgs	39	1,322
Br. goods, cs.	4	368
Tacks, cs.....	6	190
Iron, pkgs....	155	2,836
Clocks, cs....	8	291
Elec. app., cs.	6	400
Copper, bbls.	45	6,326
Br. goods, case	1	63
Uruguay.		
Plm., gals.	85,000	9,710
Ag. imp., pkgs	287	7,257
Hdw., cs.....	173	3,710
Clocks, bxs...	4	140
Mf. iron, pkgs	34	290
Mach'y, cs....	18	840
Hayti.		
Plm., gals....	5250	752
Mf. iron, pkgs	42	733
Boiler	1	1,650
Cop. goods, cs	7	129
Evaporator...	1	675
Cartridges, cs.	23	950
Windm'ls, pgs	80	192
Cutlery, cs....	12	110
Hdw., cs.....	67	918
Ag. imp., pkgs	2	62
Mach'y, pkgs.	48	769
Nails, pkgs...	75	330
Sew. ma., cs..	28	355
Revolvers, case	1	107
Bell	1	40
Pumps, pkgs.	3	143
Iron, pkgs....	80	139
L. r. goods, case	1	24
Copp'r, sheets	4	420
Constantinople.		
Plm., gals.	233,000	25,630
Oporto.		
Hdw., case ...	1	45
Mf. iron, pkgs	28	244
Piræus.		
Plm., gals	141,270	13,540
Brazil.		
Hdw., cs.....	515	7,891
Iron, cs.....	234	1,151
Mach'y, pkgs	76	3,957
Wire g'ds., cs.	2	36
Cutlery, cs....	28	960
Nails, kegs....	135	511
Nails, cs.....	4	29
Clocks, pkgs..	5	135
L. r. goods, cs.	1	413
Tacks, cs.....	15	123
Stpd ware, cs	2	2,586
Bells, case.....	1	60
Mf. iron, pkgs	310	3,754
Guns, cs.....	4	675
Ag. imp., pgs.	127	1,823
Sew. ma., cs..	65	3,071
Br. goods, cs.	2	65
Pumps, pkge.	1	50
F. extinguishers, case...	1	50
Plm., gals.	90,500	10,652
Cotton gins, cs	13	725
Revolvers, case	1	155
China.		
Mach'y, case.	1	75
Hdw., cs.....	2	420
Mexico.		
Hdw., pkgs...	226	5,440
Springs.....	220c	4,825
Nails, kegs....	5	82
Pistols, cs....	4	2,705
Iron safes.....	4	383
Arms, cs.....	48	13,206
Plm., gals....	4050	490
Powder, lbs.	64,080	6,125
Fire engine...	1	170
L chairs, pcs.	24,594	4,577
Valves, bxs...	6	480
Steel, pkgs...	338	1,505
Nails, kegs....	113	372
Mf. iron, pkgs	579	9,103
Sew. ma., cs..	376	4,020
Mach'y, cs....	208	19,501
Pump., pkgs.	4	150
Cars, pkgs...	3604	26,899
Surveying instruments, cs	2	450
Ag. imp., pkgs	36	944
Clocks, pkgs.	47	463
Cartridges, cs	8	223
Cutlery, cs....	25	1,146
L. r goods, case.	1	72
Shot, lbs.....	242	70
Mf. steel, pgs	39	1,322
Br. goods, cs.	4	368
Tacks, cs.....	6	190
Iron, pkgs....	155	2,836

COAL.

In Coal trade circles deliveries are being made with all dispatch, so far as means of transportation are at command. There is more solicitude in this regard, on account of the near close of navigation than on any other. Little is said about new orders, unless it be the impossibility of receiving them, if of any magnitude, for immediate delivery. For Lehigh Coals some of the agencies decline receiving orders altogether, at least for Stove and Chestnut sizes, being largely oversold. In any case, precedence is given to customers who are liable to be cut off by the close of navigation. Sales are fully up to circular prices. In some offices nothing is known about prices, the business doing being exclusively in the line of deliveries. Prospects of a lively trade are considered good through the best part of the winter. Quotations are unchanged, viz.: Wyoming, $3.75 @ $4.15 for Lump, Egg, Grate and Chestnut; Stove, $4 20 @ $4.50; Lehigh, $4.40 @ $5.25 for Lump; Chestnut, $4, and about $4 25 for other sizes. Freights to Boston are $1.50; to Providence, $1 @ $1.05. Vessels scarce.

The Pottsville *Miners' Journal* says: "The good condition of the iron trade affords a ready sale for the Lump and Steamboat sizes for use at the blast furnaces, and Broken is in fair request. The excess of production over last year, about 4,000,000 tons, is still kept up, and will be maintained, with some increase, during the remainder of the season." And again; "The demand for the Domestic sizes is much in excess of the ability to meet, notwithstanding that the collieries are being pushed to their full capacity to produce. The inability to fill orders promptly occasions some uneasiness on the part of those who are short of coal."

In Bituminous Coals there is a steadily increasing demand from manufacturers through a wide range of industries. Cumberland is active and in demand, but freights are high and vessels scarce. There are very few boats now on the canal, so that shipments from Georgetown are very moderate. Prices are stiff at $3.50 @ $3.60 at Baltimore; at Georgetown, $3.30 @ $3.40. Caution is observed in taking large orders, on account of the scarcity of cars. The European steamers are taking more of late, in consequence of the greater consumption in long passages.

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy	₩ lb.	$0.15	@	$0.16
Copper Bottoms	"	.13	@	.14
Yellow Metal	"	.08½	@	.09
Brass, heavy	"	.11½	@	.12
Brass, light	"	.08½	@	.09
Composition, heavy	"	.14	@	.15
Lead, heavy	"	.04¼	@	.04½
Tea Lead	"	.04¼	@	.04½
Zinc	"	.03¾	@	.04
Pewter, No. 1	"	.13½	@	.14
Pewter, No. 2	"	.08	@	.09
Wrought Iron	₩ ton.	24.00	@	25.00
Light do	"	12.00	@	.....
Stove Plate	"	12.50	@	13.00
Machinery do	"	15.00	@	15.50
Grate Bars	"	6.00	@	7.00

The prices current (prices paid by local dealers) for Rags, &c., are as follows:

Canvas, Linen	₩ lb.	3½c.	@	4 c.
White Cotton, New	"	3½c.	@	.....
" No. 2	"	2½c.	@	.....
White, No. 1	"	4 c.	@	4¼c.
" No. 2	"	2¾c.	@	2½c.
Seconds	"	1 c.	@	1¾c.
Soft Woolens	"	9½c.	@	10½c
Mixed Rags	"	2 c.	@	2½c.
Gunny Bagging	"	1¾c.	@	.....
Jute Butts	"	2 c.	@	2¼c.
Kentucky Bagging	"	4½c.	@	4¾c.
Book Stock	"	2½c.	@	2¾c.
Newspapers	"	1¾c.	@	1½c.
Waste Paper and Scraps	"	½c.	@	¾c.
Kentucky Bale Rope	"	4c.	@	....

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., PHILADELPHIA, Nov. 21, 1881.

Pig Iron.—The market continues firm, and there is very little change to note in any direction. The demand for No. 1 Foundry Iron is moderately active; the best brands command full rates, while others are somewhat irregular, and not readily saleable at over $25. Buyers are unusually discriminating in their selections, and anything not entirely acceptable in point of quality is difficult to place, even at comparatively low figures. No. 2 Foundry is scarce and firm; several large lots were taken last week, and stocks in makers' hands are unusually low, and held at $22 @ $22.50 at furnace, say, $23.50 @ $24 Philadelphia. Mill Irons are as scarce as ever, and prices are, if anything, a shade higher. It is extremely difficult to place large orders, and sales have been chiefly at $21.50 at furnace; anything below that is exceptional, although several well-known brands readily command $22 at furnace, the range being $22.50 @ $23.50, delivered at Philadelphia. White and Mottled Irons is a little plentiful, and is offered at $18 50 @ $19 and $19.50 @ $20 respectively. The outlook as regards Pig Iron continues favorable, and although there is a little hesitancy in No. 1, there is no reason to think prices will weaken. There has been a somewhat wide range in quotations for several weeks, owing to scarcity of the best makes, which have gradually been worked up to $26 @ $27, at which they are steady. Other brands are a trifle heavy, and although not in large supply, are sufficient for the present to counteract any further advance. In the next lower grades, however, the market is exceedingly strong, and furnacemen are not only closely sold up, but have large orders offered almost daily, many of which they are unwilling to accept because of the heavy engagements already made. On the whole, therefore, the market may be said to be unchanged, weakness in one place being offset by increased strength elsewhere.

Foreign Iron.—There is nothing doing in Middlesboro, very little offered and no demand. No. 3 may be quoted at $20 @ $21, nominal. Scotch is held at $25 @ $26 for the best makes; a lot of No. 3 is said to be available at about $20, but there is no demand for that description. Bessemer is quiet; we have not heard of any transactions, and consumers say they are not in the market at over $25. Owing to the high rates of freight, importers say they could not name less than $26 @ $26.50, and are not anxious for business. Advices from the other side report a fair demand and steady prices.

Muck Bars.—There is a fair demand, and prices are steady and unchanged. Holders ask $45 at mill, at which figure small lots have been placed.

Blooms.—Are unchanged, we continue last week's quotations, viz.: Charcoal Blooms, $72.50; Run-out Anthracite, $60 @ $62.50; $52.50 for Scrap Blooms, and $47.50 for Northern Ore Blooms.

Bar Iron.—The demand is large and some heavy transactions are reported. Orders for lots of 100 to 300 tons each have been taken in several instances, and there are indications that the extreme scarcity is passing away. The increased production is beginning to tell, and, although there is no reason to expect anything like depression, it is quite likely that there will be a gradual quieting down until after the holidays. Some sizes are still a little scarce, but manufacturers are evidently catching up with their orders, and, for moderate sized lots are not unwilling to accept business at 2.7¢, with less mention of higher figures than was the case during the early part of the month. Skelp Iron is in very active demand and commands 3¢ readily for prompt delivery. We hear of a sale to-day at 3.25¢, for prompt delivery of Skelp, and at 2.8¢ for a large lot of Bars.

Structural Iron.—There is less inquiry, and manufacturers are having an opportunity to catch up with their back orders. These are about sufficient to carry them over into spring, so that it is considered somewhat of a relief to be let alone for a few weeks. There is nothing of an unfavorable character to be inferred from this condition of affairs, those having large orders to place have placed them, and those having facilities for doing the work have got the work, so that for a while it is likely that business will be of a comparatively retail character. Angles are 3¢ @ 3.25¢; Beams, 4¢; Channels and Tees, 4.25¢; Bridge Plates, 3.5¢; Rolled Axles, 3.5¢; Hammered, 3.75¢.

Plate and Tank Iron.—There is a fair demand, and no change of any importance calling for remark. The mills have a good deal of work on hand, and are scarcely in a position to enter very large orders, although there is a disposition to take care of the smaller class of trade, from which probably more satisfactory rates can be obtained. Prices are steady, however, and the following quotations are as near the market as can be given, viz.: Tank Iron, 3.50¢; Refined, 4¢; Shell, 4.25¢; Flange, 5.25¢ @ 5.50¢; and Firebox, 6.25¢ @ 6.50¢.

Wrought Iron Pipe.—There is a very active demand, and many of the mills are now running day and night. Boiler Tubes are quoted at 40 %, Gas and Steam Pipe 55 % discount from list price.

Sheet Iron.—The same report can be made as during the past month—everybody busy, stocks light and supply unequal to the demand. Prices depend a good deal upon what parties may have in stock, but as a rule the following fairly represent the market:

Common Sheet, No 27 and 28	3½¢
Common Sheet, No. 26	3¢
Common Sheet, No. 22 to 25	4¼¢
Common Sheet, No. 16 to 21	4½¢

Best Refined ¼¢ @ ½¢ advance on the above.

Best Bloom Sheets, No. 26 to 28	7¢
Best Bloom Sheets, No. 22 to 25	6¾¢
Best Bloom Sheets, No. 16 to 21	6¼¢
Common Red Plates, 3-16 to 16	3.5¢
Blue Annealed, 3-16 to 16	3.8¢ @ 4¢
Best Bloom Galvanized, discount	30 %
Second quality, discount	40 %

Steel Rails.—Prices are a shade higher, and it would be difficult to get anything offered at less than $62.50, and for certain dates higher figures are named. It is very difficult to give exact quotations, which in any event depend greatly upon terms, deliveries, &c. The demand is fairly active, and all the indications favor an extraordinary consumption during the coming year. Manufacturers have sold almost all they care to for the present, so that the tendency is rather in the direction of higher prices. This is strengthened by advices from abroad, from which it appears that $62.50 to $64 at tide are very inside figures, and early deliveries quite out of the question. Sellers are in fact unwilling to quote c. i. f. prices, because of the high rates of freights, and the uncertainty in regard to the same matter during the early months of next year. A sale of 5000 tons light rails for April, May and June shipments was made at £6. 10/, f. o. b., and heavy sections are offered at £6. 2/6 @ £6. 5/, f. o. b. Buyers have a decided preference for American Rails, but where foreign have to be taken it is difficult to get bids other than c. i. f.

Steel Blooms.—It would be difficult to offer anything at rates likely to be acceptable to buyers. Importers cannot quote below £7, c. i. f., and in some cases are asking still higher figures. Buyers could probably be found at $46, duty paid.

Iron Rails.—There is nothing doing in large lots, although manufacturers are now in a position to commence work on new orders. Lots of a thousand tons or upward could be had at about $47.50 @ $48, but buyers appear to be scarce, although several inquiries have been made which it was expected would lead to business. Small lots sell at $48 @ $52.50 at mill, according to weight of rail, but we have not heard of any bids for large lots. Foreign Rails in store have been gradually worked off at about $47 for 35's, down to $45.50 @ $46 for 56's, with sales at these figures within the past week.

Railway Fastenings.—Prompt deliveries command about a tenth advance on regular quotations, which are as follows: Spikes, 3.15¢; Fish Plates, 2.6¢; Bolts and Nuts, 3.25¢ @ 4.0¢.

Old Rails.—Owing to the absorption of stocks this market has been almost out of the race of late. For a lot of Flanges in store $30 was bid and refused, but they could be had to arrive at that or a lower figure. Double Heads may be quoted at $32, nominal, and Flanges, $30.

Steel Crops.—There is some inquiry, and the feeling is a trifle stronger than it was a week ago. Holders ask $27, but we have not heard of any sales at over $26.50.

Scrap Iron—Continues firm and scarce. Choice No. 1 commands $32 @ $33; Medium and Short, $30 @ $31; Machinery Scrap, $20 @ $21.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, PITTSBURGH, PA., Nov. 21, 1881.

While we have had a good deal of rain and bad weather the past week, one very important result was a big river and the shipment of between eleven and twelve million bushels of coal to the down-river towns and cities, where, with the source of supply shut off by the suspension of navigation for over four months, stocks had been almost exhausted and prices very high in consequence.

Pig Iron.—We have had quite an active market the past week, sales of some 7000 tons having been reported, and with an increased demand prices are firmer; some of the sales in question were at an advance. There is no trouble in effecting sales within the range of present quotations. The representative of a commission firm remarked to your correspondent that his firm, he had reason to believe, could dispose of 10,000 tons at ruling prices, if they could only get it. The quantity of Pig Iron being consumed in Pittsburgh and vicinity at the present time is larger than ever before, while the supply in sale yards has not been as much reduced for years. Good strong Neutral Irons may be quoted at $24, 4 mos.; White and Mottled, at $22 @ $22.50; Rod short, inclined, $24.50 @ $25; Foundry, $24 @ $24.50 for No. 2, and $25 @ $26 for No. 1.

Bessemer Iron.—There is considerable inquiry and but little offering, and prices are strong, with a decided upward tendency; while the last sale reported, some weeks ago, was at $28.50, there are but few if any sellers at that figure. Some furnacemen predict that $30 will be realized before the close of the year.

Muck Bar—Continues in very scant supply, and may be quoted at $45 @ $46, although some buyers, whose wants are urgent, might pay $1 more for immediate delivery.

Manufactured Iron.—The demand for all kinds keeps up well, and it is not uncommon to hear of orders being turned away. Our manufacturers have had a good deal of trouble for some time past from the lack of transportation, but, now that river navigation has been resumed, the railroads have been relieved, and the facilities for transportation largely increased. Prices firm but unchanged at full card rates, 60 days, with the usual discount of 2 % for cash; Bars, 2.50¢ rates; Sheet, 4.30¢ for No. 24; Tank, 3.30¢; No. 1 Boiler Plates, 5½¢ @ 5¾¢.

Nails.—While there is a falling off in new orders, makers are still well supplied with old contracts and are just as busy as ever. Prices remain unchanged at $3 25, 60 days, with an abatement of 10 cents per keg on car-load lots, and 2 % off for cash.

Wrought Iron Pipe.—The activity noted for some time past continues, and some of the mills, it is said, are having trouble in obtaining supplies of Pipe Iron, which has been hard to get for some time past. Discounts on Gas and Steam Pipe remain unchanged at 55 @ 57½ %; on Boiler Tubes, 40 %; Oil Well Casing, 85¢ per foot, net; do. Tubing, 25¢.

Rails, &c.—Steel Rails for delivery this year are still quoted at $62 @ $63, cash, at mill. Bessemer Blooms are quoted at $47 @ $48, and ditto Billets at $60 @ $65. For Railway Fastenings prices are firm, with mills very busy; orders are on the market for delivery during January and February. For present delivery, Spikes are quoted at 3¢ @ 3¼¢, 30 days; Splice Bars, 2.60¢ @ 2.75¢; Track Bolts, at 4¢ @ 4½¢.

Steel.—There is a continued good demand for all kinds of Merchant Steel, and prices are firm, but unchanged. Best quality of Refined Cast Steel, 11¢ @ 12¢: Crucible Machinery, 6½¢ @ 7¢; Bessemer and Open-hearth Machinery, 5¢; ditto Spring, 4¢ @ 4½¢; ditto Plow, 4¼¢ @ 4½¢.

Scrap.—Wrought Scrap is quoted at $29 @ $30 for Ordinary and $31 @ $32 for selected Railroad; Crop Ends, $29 @ $30 per gross ton; Old Car Wheels, $28 @ $30, gross; Cast Borings, $15 @ $16; Wrought Turnings, $21 @ $22 per net ton. There is a fair business and prices are firmer.

Window Glass.—New orders are not as plenty as they have been, but manufacturers generally are well supplied with old ones and have about all they can do. Prices are steady. Discounts are unchanged, car-load lots, 60 and 10 and 5 % on single, and 70 % on double-strength, 60 days, with usual discount of 2 % for cash.

Coke.—There is no abatement in the demand. Large shipments have been made by river within the past two days, the effect of which will be to ease up the railroads. The railroad companies have promised to furnish an increased number of cars at the disposal of the Coke manufacturers in the near future. Prices are quoted steady at $1.60 @ $1.65 per ton, free on cars at ovens, for large lots, and $1.70 @ $1.75 for small foundry orders.

CHICAGO.

Office of *The Iron Age*, 36 and 38 Clark Street, cor. Lake Street, CHICAGO, Nov. 19, 1881.

Pig Iron.—The condition of the Pig Iron market generally is very firm and the demand excellent. We learn of a sale of 3000 tons Nos. 2 and 3 Lake Superior Charcoal, for January delivery, at a price considerably above our quotations for those grades. The amount of imported Scotch in dealers' hands here is exceedingly small and commands a good price; we quote, nominally, $29 @ $30. Lake Superior is quoted as follows: Nos. 1 and 2, $31; No. 3, $32; Nos. 4, 5 and 6, $33 @ $34. Calumet has been in good demand and is quoted at $28 for No. 1, and $27 for No. 2. Crane, No. 1, $29; and No. 2, $28.50. American Scotch, $25.50 @ $28.50, and Silvery Soft, $24 @ $26.

Manufactured Iron.—The market remains unchanged and demand very good, the only drawback being the ill-assortment of stocks held by dealers. We quote: Bar, 3¢; Angle, 3.80¢; T, 4¢; Hoop at 3.80¢ rates; Sheet, Plate and Tank, which latter is very scarce, as follows: 10 to 14 gauge, 4¢; 15 to 17 ditto, 4.30¢; 18 to 21 ditto, 4.60¢; 22 to 24 ditto, 4.80¢; 25 and 26 ditto, 5¢; and 27 ditto, 5.20¢. Patent Cold-rolled Shafting, dis. 20 %; Norway Iron, Original Bars, 4¾¢ rates; Norway Iron, re-rolled, 5¾¢ rates; Ulster Iron, 4½¢ rates; Low Moor Iron, 8¢ rates; Nuts and Washers, 7¼¢ off list; Wrought Boat Spikes, 4¢ rates.

Nails.—The diminished stocks of Nails in this market continues to be a source of annoyance to dealers, while the demand keeps up to its usual standard. We quote 10d. to 60d. as werth $3.40 per keg net.

Steel.—We have no new features to note; prices are firm and demand fair. We quote: Tool, 11½¢; Machinery, O. H., 5½¢; Crucible Machinery, 7¢; Hammer, 2 inches and under, 8¢; over 2 inches, 9¢; Cast Spring, 6½¢; and O. H. Spring, Tire and Sleigh Shoe, 5¢. The quotations on this latter class of Steel would be shaded a trifle on large lots. Sheet, first, second and third quality, 12¢, 10½¢ and 8½¢, respectively; Crucible Plow, 6¢ @ 6½¢; Eagle Plow, 5¼¢; Iron Center Plow, 10¼¢; and soft Steel Center Plow, 10¾¢.

Scrap Iron.—Continues without change at our last week's quotations, which are as follows: No. 1 Wrought, $24 @ $25; No. 1 Forge, $27 @ $28; Heavy Cast, $20, and Stove Plate, $14.

CHATTANOOGA.

Office of *The Iron Age*. Market and 8th Sts., CHATTANOOGA, Nov. 21, 1881.

Heavy products are all in good request in the South. Some lines have felt the effects of a slight falling off on account of the shortness of crops, but these are exceptional and such as the people can dispense with. The streams keep up well, owing to the abundant rains. The activity of old and the planning of new enterprises go on with rather more than usual vigor. The weather has been showery and warm, until the close of the week, when a sharp and cold northwest storm set in.

Pig Iron.—The term "Foundry Iron" means several things that are not exactly Foundry Iron in the present condition of the trade. At $23 as the outside figure, furnacemen could not, considering the price of Mill Irons, afford to make No. 1 Foundry. Prices have been very strong for some time, and foundrymen have finally made pretty liberal offers, and even with those in sight the higher grade metals are likely to be scarce this winter, as furnaces generally have all they can do to supply orders for Forge already booked ahead several months. We quote: No. 1 Foundry, $24 @ $26; No. 2 Foundry, $21 @ $22; Gray Forge, $19 @ $20; White and Mottled, $16 @ $18; Car-wheel Metal, $38 @ $40.

Ores.—We quote: 50 % Brown Hematite, per ton, $2 @ $2.75; Red Fossil, $2 @ $2.25, delivered at furnace. Several furnaces are still experiencing difficulty in getting full supplies; but as the price is regulated by the rate for common labor, no considerable advance will occur soon.

Miscellaneous Articles.—Old Rails, ordinary lots, have advanced, and now command $28. The advance in Pig tends to stiffen Scraps, but as yet prices remain steady. Wrought Scrap, $20 @ $25; Cast Scrap, $10 @ $15; Old Wheels, $28 @ $30.

Nails—Are steady at $3.25 rates, with prospects of a steady winter business.

Manufactured Iron.—Bar is strong at $2.75. All articles in this list are stiff and scarce. We quote: Railroad Spikes, $3.30; Track Bolts, $4.25; Fish Plate, $3.

Coal.—Fancy Lump, $5 net ton; Common, $4.25; run of mine, $2 at mills. There is much activity in the opening of new banks.

Coke.—Furnace Coke, $3 at point of consumption; Foundry, 10¢ @ 12¢ per bushel.

Steel and Iron Rails.—Steel Bars, $62 @ $64 at mill; Iron, $50 @ $52; Small, $57 @ $60.

BOSTON.

NOVEMBER 19.—The market presents no new or interesting features, and though satisfactory is monotonous. There is a good trade, as the wants of foundrymen compel them to have Iron, but everything is done in a quiet manner. All the Iron turned out is being readily taken at the present figures, though there might be a little more stock on hand available for delivery than a few weeks ago. It is thought that the large users of Iron have contracted for their supplies during the winter months, and the demand which will exist during the winter will be from the small dealers and in moderate quantities. The market for American Pig is quoted firm, and it will probably remain so during the winter, unless the price of foreign Iron declines sufficiently to force prices down here also. That this may happen is possible, as the market abroad has been fluctuating somewhat, and may decline. Foreign Iron may be stated as dull, and somewhat easier. American Pig is quiet and firm. *American Pig.*—There is no change in demand. Prices are firm. Prices at shipping ports are $25.50 @ $26 for No. 1 X; $23 for No. 2 X, and $22 for Gray Forge. Small spot lots command $2 @ $3 per ton above these quotations. *Foreign Pig.*—The market is quiet and somewhat easier. We quote Eglinton at $23 @ $24 for moderate sized lots; Langloan, $26.50 @ $27; Gartsherrie, $25 @ $26; Carnbroe, $24.75 @ $25; Glengarnock, $25; Clarence No. 3, $21; Shotts, $26.50 @ $27. *Old Rails.*—A good demand exists for Old Rails, and prices are firm. We quote $31 for American and $30 for foreign. *Manufactured Iron.*—All kinds of Manufactured Iron is in good demand, and dealers and mills are doing an excellent business. Such goods as horse shoes, horse-shoe nails, and other seasonable goods are in very active demand, and though no advance has taken place, they are very scarce and firm at quotations. Bar Iron remains in the same position, with very firm prices. The pressing demands on mills and dealers still continues, and stocks of dealers remain light. The Bar Iron market may be afforded some relief, and some of the pressing orders filled, by the starting up of the Ligonia Iron Works, of Portland. These works have been bought by Boston and Portland capital, and will be started up next week, under the name of the Portland Rolling Mills, for the manufacture of Bar Iron and Iron and Steel Rails. There are but very few lots of foreign Bar in this city,

and what few there may be are small lots of 100 or 150 tons, and are sold quietly. Sheet and Plate Iron are in splendid demand, and no changes are noted in quotations. There is a good trade for seasonable Steel goods. The demand for Nails continues good, and prices are firm, but immediately after Thanksgiving trade is expected to slacken up. *Bar.*—The demand continues active and prices are firm. We quote $2 90 @ $3 for Bar. Horse Shoes are in excellent demand and very strong at $4.25 @ $4.33. Swedish and Norway are very firm at $4 @ $5 for Bars, and $4.75 @ $5 for Shapes. *Plate Iron.*—The inquiry is excellent, and prices quoted are firm. We quote Tank at 3½¢; Refined at 4¼¢; Shell at 4½¢; Flange at 5¼¢, and Tubes unchanged at 40 % from list. *Sheet Iron.*—There is no change in quotations or in the amount of trade. We quote: Sheet Iron, 4½¢ @ 4¾¢; ditto Refined, 5½¢ @ 5¾¢; Galvanized, 8½¢ @ 11¼¢; Russia, 11¢ @ 12¢. *Steel.*—Trade is good. We quote: Best English Cast, 14¢ @ 15¢; American do., 12¢ @ 12½¢; Bessemer Machinery, 5¢ @ 6¢; Wedge and German, 7¢; English Spring and Calking, 7¼¢ @ 7½¢; ditto American, 5½¢ @ 6¢; Tire, 4¢ @ 4¼¢; Sleigh Shoes, 3½¢ @ 3¾¢. *Nails.*—The demand continues active and stocks are still light, with firm prices. We quote $3.40 @ $4.50 for 10s per cask. *Copper.*—The Copper market is firm and quiet. We quote: Ingot, 18¢ @ 18½¢. Jobbing sales at 18½¢. The quotations for manufacturers are unchanged and firm. We quote: Sheathing, 26¢; Braziers, 28¢ @ 30¢; Bolt, 28¢; Copper Bottoms, 29¢ @ 30¢; American Yellow Sheathing Metal, 18¢; Yellow Metal Bolt, 20¢; English Yellow Sheathing Metal, 14¢, in bond. *Lead.*—The market for Lead continues about the same. We quote $5¼ @ $5¾ for carload lots. Manufactures are unchanged. We quote: Bar, 7¢; Pipe, 7½¢; Sheet, 8¢; Pin lined Pipe, 15¢; Tin Pipe, 35¢, all less 10%. *Zinc.*—The scarcity in Spelter and Zinc still continues. We quote Spelter at $5.75 @ $6. Sheet Zinc at $7.50 @ $8. *Tin.*—The market in London has risen greatly, and prices here have risen in sympathy, and the indications are that a further advance will be made. Considerable shipments are being made to England, and some foreign orders are being filled. We quote 22¢ @ 22¼¢, and 22½¢ for jobbing lots. *Tin Plates.*—The demand is better, and some advances have been made. We quote: Charcoal Bright at $6.50; Ternes at $5.75 @ $7.75; Cokes, $5.75; ditto Ternes, $5.25 @ $5.50.—*Commercial Bulletin.*

CINCINNATI.

NOVEMBER 21.—*Pig Iron.*—Orders to dealers in the past week have been fully up to supply, and deliveries have been made warm from the Pig beds. The stocks in store everywhere is being drawn upon for immediate consumption. It is thought that the production and stocks on hand will meet the requirements of consumers through the coming five or six months. Prices are firm without any speculative movement, with quotations as follows:

Hanging Rock Charcoal Foundry	$29.00 @ 29.50
No. 1 Coke and its equivalent	27.00 @ 27.50
No. 2 " " "	26.00 @ 26.50
Softeners	25.00 @ 25.50
Cold-blast Charcoal Car-wheel Irons	35.00 @ 38.00
Warm-blast " " "	28.00 @ 35.00

Bar Iron $2.70, card rate, and an active market.

LOUISVILLE.

Messrs. GEO. H. HULL & Co., Commission Merchants, report to us as follows, under date of Nov. 18, 1881: Hot-blast Iron have experienced another advance, and are ruling from $1 @ $2 per ton higher than 10 days ago. We revise quotations accordingly. Nearly all Iron sold in this market is for cash, and our quotations are on this basis. The market continues very strong and active.

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	$29.00 @ 30.00
No. 2 " "	27.00 @ 28.00
No. 1 Southern, Charcoal	26.00 @ 27.00
No. 2 " "	24.50 @ 25.00
No. 1 Hanging Rock, Stonecoal and Coke	27.00 @ 27 50
No. 2 Hanging Rock, Stonecoal and Coke	25 00 @ 26.00
No. 1 Southern, Stonecoal and Coke	27.00 @ 27.50
No. 2 " " "	25.00 @ 26.00
"American Scotch"	24.00 @ 25.00
Silver Gray	23.00 @ 24 00
Scotch	@

MILL IRONS.

No. 1 Charcoal, Cold-short and Neutral	24.00 @ 25.00
No. 1 Stonecoal and Coke, Cold-short and Neutral	24.00 @ 24.50
No. 2 Stonecoal and Coke, Cold-short and Neutral	22.00 @ 23.00
No. 1 Missouri and Indiana Red-short	26.00 @ 27.00
White and Mottled, Cold-short and Neutral	18.00 @ 20.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	35.00 @ 36.00
Alabama and Georgia, Cold-blast	34.00 @ 36.00
Kentucky Cold-blast	34.00 @ 36.00
Hanging Rock, W. B.	32.00 @ 33.00

W. B. BELKNAP & Co., Iron and Steel Merchants, Nos. 113 and 115 Main street, report to us as follows, under date of Nov. 19: While there is no decline to quote on Bars, still it is evident that the mills are cleaning up their order books, as more is offering for reasonably prompt delivery. There is little expectation of any further advances until January at earliest, when the heavy buying generally sets in. We hear of $5 advance on a large lot of Neutral Pig, bought last July, being declined. If that movement continues, Bar cannot drop off much, if any. Light Sheets are at last coming into market. There is yet a strong and widespread call for Firebed and Plates. Nails are very firm, and all the cutting from full card that we can learn of is by jobbers, who are drawing on summer bought stocks. Hoops and Bands advanced another 1-10th, rather to the surprise of the trade.

ST. LOUIS.

Messrs. HOFFER, PLUMB & Co., Pig Iron and Iron Ore Merchants, 417 Pine street, write us, under date of November 19: There is no change to report in this market. Quietness and strength are the ruling features. Prices are:

HOT BLAST CHARCOAL.

Missouri	$27.00 @ 28.00
Southern	27.00 @ 28.00
Hanging Rock	29.00 @ 30.00

COAL AND COKE.

Missouri	None offering
Southern	27.00 @ 28.00
Ohio	28.00 @ 29.00

MILL IRONS.

Red-short	25.00 @ 26.00
Neutral	23.00 @ 24.00

CAR WHEEL AND MALLEABLE IRONS.

Missouri	28.00 @ 34.00
Southern	25.00 @ 28.00
Ohio	32.00 @ 42.00

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of November 21: Trade for the past week has ruled fair, with short supplies. Values remain firm and unchanged, with upward tendencies.

Bef. Bar Iron, 1 to 6 x ½ to 1	₩ lb 2 8-10 @ 3 ¢
" " 1 to 4½ x 1½ to 2	₩ lb 2 8-10 @ 3 ¢
" " ½ to 2, Round and Square	₩ lb 2 8-10 @ 3 ¢
Hoop Iron, 1½ wide and upward	" 3½ @ 3¾ ¢
Band Iron, from 1¼ to 4 in. wide	" 3 @ 3¼ ¢
Horse-shoe Iron	" 3¾ @ 4 ¢
Norway Nail Rods	" 5¼ @ 6 ¢
Black Diamond Cast Steel	" 13½ @ 14½ ¢
Machinery Steel	" 9 @ 9½ ¢
Cast Spring Steel	" 8 @ 8¾ ¢
Common Horse Nails	" 20 @ 10 ¢
Perkins' Horse shoes ₩ keg of 100 lbs	$4.37½
" Mule shoes	5.37½

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENG., Nov. 7, 1881.

THE IRON MARKETS

have been quiet during the week, with but a few facts to note of any interest and none of real importance. It is, perhaps, not very easy to make accurate deductions from present conditions as to the course of matters in the future; yet I think those who look for steady firmness and a further rise in prices early in 1882, will be about as near the truth as may be. It is contended by some persons that we shall witness a very marked and notable relapse between this and the end of the year, and in the confident expectation that such will be the case, they are holding back and deferring their purchases. I do not pretend to prophesy, but I venture to think that those who are of this way of thinking will be deceived, and will find that the course of the iron market here will run in precisely the opposite direction to that just mentioned. I am led to form this conclusion by reason of the undoubted fact that the great majority of the works are well employed, with orders on their books sufficient to last for at least two months. In some departments, in fact, work is already assured for three or four months, and more might have been booked had manufacturers been willing to accept further specifications at the rates now and recently ruling. Assuming that these futile inquiries have not been the outcome of speculation, it follows that the wants of which they are the signs must sooner or later be satisfied. The orders cannot be placed outside Great Britain on terms more favorable than those obtainable at home, for the Belgian and German houses which have on several former occasions taken our overflow orders are as busily engaged as our own establishments. The capacities of these foreign concerns, indeed, are not of the first order, even as viewed in the most sanguine light, and if our advices be correct, they are being taxed to the utmost. I read in *The Ironmonger* of November 5, for instance, as regards the Charleroi district of Belgium, that "plenty of work is the rule everywhere. * * * Numerous proposals for large quantities have been made by foreign houses at low prices," but those accepted are only at the new rates. "The market generally for metals is in a favorable state, there being plenty of *bona fide* orders, and no speculation." German advices are similarly strong, and the French works are known to be sold very far forward. That being the case, I cannot avoid the inference that all the probabilities are in favor of continued firmness and, possibly, additional advances. This is rendered the more likely when we look at the buoyancy which is reported to pervade your market, a buoyancy of which we have convincing proofs in the shape of specifications for Welsh bars, Staffordshire sheets and hoops, Scotch, Middlesboro' and hematite pig iron, blooms, scrap and rails. It is not necessary for the success of my argument to rely upon the continuance of your buying on this side. Taking the thing as it stands, it is a factor in the calculation, even should your purchases cease to-morrow and not another ton of iron be sent across the Atlantic. Another point which must be borne in mind is the circumstance that higher wages will have to be paid throughout Staffordshire, Derbyshire, Shropshire, Worcestershire, &c., in January next and thereafter, as the inevitable outcome of the higher selling prices now prevalent. The accountants of the Board of Arbitration will report this fact at the end of the quarter, and under the sliding scale arrangement the men will be entitled to higher wages. Given also dearer fuel—an extremely likely contingency—and there is no escape from the conclusion that finished iron will advance by 10/, or even 20/ per ton early in the New Year. It may seem a little premature to talk about 1882 at the present time, but a moment's reflection will serve to show that the probabilities of that not very distant period have important bearings upon the present. I have not sought to prop up this calculation—or theorizing if you like the term better—by referring to the general movement for higher wages which is afloat among the colliers, ironstone miners and ironworkers of the country, but that, too, is an element which may speedily develop and make its influence widely felt.

My mere chronicle of the doings of the week is rather bare. At Glasgow, as well as at Middlesboro, warrants and makers' brands of pig iron have been dull. This has been brought about by large sales and other speculative operations, aided by the partial cessation of the shipping season to the Baltic and Canadian ports. Toward the close of the week, however, there were signs of a reaction, on the strength of smaller additions to Connal's Glasgow stores, better Scotch shipping returns, and the remarkable diminution of stocks (over 21,000 tons) shown by the monthly returns of the Cleveland Ironmasters' Association. The last-named statistics are much more favorable than had been anticipated, and show that the reduced production is much more effective in Cleveland than in Scotland. The question of the limitation of the output is still being discussed here. The *Engineer* of November 5, for instance, devotes a long article to its justification, and expends some of its pent-up energies in the demolition of a dummy antagonist, and in the demonstration of what is an absolutely self-evident proposition. Sooner or later—probably within the next few weeks—we shall witness a different state of things as to Scottish stocks. The producers will cease the conversion of their iron into warrants, and there will be small additions, if any, to Connal's stores. In the meantime it may be noted that although the open market has been weak, there has been nothing of the kind observable in connection with the works. On the contrary, most of the finished iron producers are quite satisfied with their aggregated position and prospects. All their surroundings will bear a hopeful interpretation, and they begin to regard the dull period as a thing of the past. The galvanizers speak of a new augmentation of selling values as a matter of the near future. They are paying more money for their sheets, and are now confronted by a possible "corner" in spelter. According to the *Ironmonger* this "corner" is said to be in course of being manipulated at Breslau, where the Silesian trade in the article is centered and controlled. These houses have the absolute power of doing as they please, and if they could get the Vieille Montagne Company of Liege, Belgium, to join the ring the matter would be settled. Any such rise would necessarily affect galvanized iron and zinc of all kinds. Fencing wire, hoops and sheets are all brisk. Rails, blooms, scrap, old rails, old leaf steel, &c., are very firm at late rates, with a good, and perhaps pressing, call from buyers on your side.

SCOTCH PIG IRON

has ruled quiet and somewhat lower all round. No marked upward change in prices is probable so long as the additions to Connal's stores continue, notwithstanding the fact that such additions are for the most part mere transfers from makers' own yards to the warehouses. The number of Scotch furnaces now blowing is 106 (including 9 on hematites) against 119 this date last year. The Bank rate is now 5 per cent., whereas a year ago it was 2½ per cent., a difference of some importance to speculators. To Connal's stocks 2317 tons were added last week, bringing up the total to 609,745 tons, against 477,067 tons this date 1880, and 495,850 tons at Christmas last. The shipments last week were good, and bring up the aggregate for this year to 486,093 tons, a decrease of 93,085 tons. The falling off has been about equally divided between foreign and coastwise consignments. The total increase in Middlesboro' shipments to date has been 34,481 tons, on a total of 249,119 tons. Ballast pig is about 42/6, and steam freight for pig iron, Glasgow to New York, 10/ per ton. Writing from Glasgow, November 5, James Watson & Co. said: "There has been very little change in the market this week, the feeling being quiet with only a restricted business doing. Makers' iron is in limited demand and prices are all a shade lower. On Monday the market fluctuated between 49/11 and 50/4½ per ton, and on Tuesday the price was firmer, with transactions up to 50/7 cash. On Wednesday the price was irregular, with a moderate business done between 50/3½ and 50/6 per ton. Yesterday the market was flat, with transactions from 50/4½ to 49/10 per ton, while to day the price touched 49/7½, closing with buyers at 49/9, and sellers at 49/10 per ton. The shipments last week were 11,981 tons, as compared with 7556 tons for the corresponding week of last year. We quote:

	No. 1.	No. 3.
G. M. B., at Glasgow	50. 6	47/6
Gartsherrie, at Glasgow	58. 6	51/
Coltness, "	59/	52/
Summerlee, "	58/6	50 6
Langloan, "	59/6	52. 6
Carnbroe, "	52 6	49 6
Calder, "	58/6	51 6
Glengarnock, at Ardrossan	53/	49/6
Eglinton, "	52. 6	49/
Dalmellington, "	50 6	47/
Shotts, at Leith	60/	52/6
Kinneil, at Bo'ness	49/	48/6
Carron, at Grangemouth	50/6	49/6

WEST COAST HEMATITES

are steady, although there has been some little underselling from second holders. On the whole, nevertheless, these irons may be classed as firm, the high prices of ores, large demand, forward deliveries and every prospect of serious wages troubles, having the tendency to render higher figures probable. Quotations of to-day are:

	No. 1.	No. 2.	No. 3.
Cleator	66/	64/	64/
Lonsdale	62/	61/	60/
Workington	62/	61/	60/
West Cumberland	62/	61/	60/
Lowther	62/	61/	60/
Moss Bay	62/	61/	60/
Distington	62/	61/	60/
Harrington	62/	61/	60/
Solway	62/	61/	60/
Macyport	62/	61/	60/

There are 62 furnaces blowing in the district and 19 are idle. Last week's shipments were 15,191 tons of Bessemer and hematite pigs and 4037 tons of rails and blooms—a total of 19,228 tons. The make of pig is 31,000 tons weekly, so that it is fairly accounted for week by week. Local ore is 15/ @ 15/6 per ton at the mines, and Spanish 17/ @ 17/6 per ton, ex ship.

CLEVELAND IRON

was quiet the whole of last week but is now steadier, owing to the very favorable returns, of which I give a summary below. Current rates for G. M. B., f. o. b. in Tees, for net cash, less the usual 2½ per cent, are:

No. 1	Foundry	46/	Mottled 40 6
2	"	44/	White 40/
3	"	42/	Refined Metal 51/
4	"	41. 6	Kentledge 42/
4	Forge	41/	

The manufactured-iron, engineering, &c., industries of the North of England are very actively engaged. The following is a summary of the returns of the Cleveland Ironmasters' Association for October:

MAKE OF PIG IRON.

	1881. October.—Tons.	1881. September.—Tons	Increase.—Tons.	Decrease.—Tons.
Make of Cleveland pig iron, Port of Middlesboro'	116,955	138,928	.....	21,973
Make of Cleveland pig iron, outside Port of Middlesboro'	28,906	28,893	13	.....
Make of Cleveland pig iron	145,861	167,790	.....	21,935
Make of other kinds of pig (including hematite and spiegel), whole district	66,386	53,859	12,527	.....
Total of all kinds, whole district	212,247	221,655	.....	9,408
Number of furnaces on Cleveland pig iron at end of month, whole district	83	91	.....	8
Number of furnaces on hematite, &c., at end of month, whole district	33	27	6	.....
Total	116	118	.....	2

STOCKS OF PIG IRON.

	1881. Oct. 31.—Tons.	1881. Sept. 30.—Tons.	Increase.—Tons.	Decrease.—Tons.
Makers' stocks of Cleveland pig iron, Port of Middlesboro'	103,197	109,642	.....	6,445
Makers' stocks of Cleveland pig iron, outside Port of Middlesboro'	36,813	43,229	.....	6,616
Makers' stocks of Cleveland pig iron, whole district	139,710	149,771	.....	10,061
Makers stores of Cleveland pig iron, whole district	77,114	82,754	.....	5,640
Pig iron in public stores—				
The N. E. Railway Company's stores	14,671	16,431	.....	1,760
Connal's stores	180,955	185,485	.....	4,530
Total	412,450	434,441	.....	27,991

The shipments were 5575 tons larger than during September. There were five furnaces running on basic pig iron.

THE BESSEMER WORKS

all remain busy, with full present occupation, and many inquiries as to next year's deliveries. Heavy lots of blooms—aggregating from what is reported at from 20,000 to 50,000 tons—are said to have been sold for the United States. In the same way steel rails aggregating 30,000 to 70,000 tons are also said to have been arranged for, to cover the early part of 1882. There is a rumor that Krupp has secured an order for 150,000 tons of rails for the States or Canada, but all details are wanting and the statement is not widely credited. Nothing new has been heard as to the intended removal of Wilson & Cammell from Dronfield to Moss Bay. It is believed that the idea will not be carried out so long as the present briskness of the business continues. The firm are said to have orders for nearly 150,000 tons on their books. They are running night and day. At Barrow, Ilston, the Phœnix, Dowlais, &c., there is much activity. All the Continental works are busy. Old Rails are fairly steady at £4. 10/ @ £4. 15/, and Scrap is in good request at £3. 17/6 @ £4. Numerous inquiries from your market are being received for all kinds of old materials.

AT SHEFFIELD

there is a very marked revival of trade in almost every department. The heavy iron and steel works are more actively engaged than for four or five years past. John Brown & Co. are much pressed in their armor plate and general iron departments, and Chas. Cammell & Co. are similarly busy. The crucible steel houses are doing a satisfactory turnover, the lower grades of that class of steel having benefited by the dearness of Bessemer material. The lighter trades are growing extremely active. One alone of the railway companies is collecting 100 tons of goods daily in excess of the average of the past three years. Many of the cutlery, electro-plate, &c., firms are running overtime and have abundant occupation assured up to Christmas. Taken on the whole, Sheffield may be safely said to have got "the turn," and to be more prosperous to-day than at any time these three years.

AT BIRMINGHAM, WOLVERHAMPTON, ETC., there is a great deal of work in hand—indeed many houses are pressed to fulfill their engagements in time. This is the more noteworthy when it is borne in mind that in all parts of the country the means of production have been vastly augmented and cheapened during the lean years of bad trade and fierce competition. The iron manufacturers have much business in hand—the galvanizers, sheet rollers, fencing wire makers and hoop rollers being unwilling to accept new commissions at present rates. The majority of the hardware manufacturers are similarly circumstanced, save that they are not refusing orders. That is to say, they are well employed, but are still looking after the future. In the chain, nail and certain other subsidiary industries the operatives are again uneasy and are moving for more wages.

SOUTH WALES AND MONMOUTHSHIRE

are doing well as regards iron and steel. Large purchases of Welsh bars for India have been made at about £5. 10/ per ton, f. o. b. The iron rail mills are busy, and the steel rail plant is on full time. Nothing has been done as yet at Cyfarthfa. Freights to American ports are scarce and dearer, being quoted at 17/6 New York, 16/6 @ 17/6 New Orleans, 27/6 Galveston wharf, and 35/ Vera Cruz, all from Cardiff. The shipments last month were as under from the ports of the Bristol Channel—Bristol, Newport (Mon.), Cardiff and Swansea:

Montreal—rails, tons	1,000
Tin plates, boxes	8,363
Iron, cases	180
Lead, pigs	850
Sheet iron, bundles	150
Fish plates, tons, &c.	98
New York—rails, tons	1,342
Crop ends, tons	637
Blooms	16,053
Wire, bundles	4,396
Tin plates, boxes	100,447
Arsenic, barrels	1,030
Bar iron, tons	50
Fish plates, tons	142
Ingots	1,400
Tin, barrels	85
Baltimore—Pig iron, tons	600
Galveston—rails, tons	1,906
Vera Cruz (Mo.)—rails tons	840
Guaymas (Mo.)—rails tons	2,915
San Francisco—rails, tons	1,352
Fish plates, &c., tons	98

These make totals of 11,366 tons rails, 637 tons crop ends, 16,053 blooms, 4,396 bundles of wires, 108,810 boxes tinplates, and 600 tons pig iron. The tin-plate industry is steady, save some little inquietude resulting from a rather heavy failure last week, and the fear that the stock will be thrown into the market bodily.

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, Nov. 6, 1881.—*Metals.*—The weather has been milder and business less active, yet the general course of trade, notably in the metal branch, has so far this fall been decidedly satisfactory. Metals were moderately active during the week, without change. We quote: *Copper.*—Chili Bars, 163.75 @ 167.50; Ingots and Slabs, 172.50; Best Selected, 178 25; and pure Corocoro Ore, 185. *Tin.*—Banca and English Refined, 267.50; Straits and Australian, 265; and Billiton, 260.25. *Lead*, 37.75 @ 38.50; and *Soutter*, 45.50 @ 46 francs per 100 kilos. *Iron.*—Producers are successful in maintaining the present range of prices, and in many instances were pushing them still higher. Their position seems to be secure for several months to come. In the Ardennes Merchant Iron is firmly sustained at 18.50 francs. No. 1, at the works. The great industry of hand-made Horse Shoe Nails is, however, seriously threatened in that quarter by machine made. All other branches continue prosperous there and busy, particularly railway material and structural Iron. In the Bouches du Rhone district an order has been received for six new steamers. Altogether, orders have been given for 150,000 tons of new steamers, to sail under the French flag at home and in England. We perceive that there were built in that country last year 565 steamers and sailing vessels, iron and steel, 376,947 tons of which for English and 68,401 for foreign account. In the Haute-Marne orders are still dropping in, but not as large ones as previously. Coke, Merchant, still commands 20 francs to 20.50; Mixed, 20; Sheets, 22.50 @ 24, and Wire Nails, No. 18, 28.50 @ 29. In the Loire and Rhone there is still much dissatisfaction on account of the navy orders for heavy artillery sent abroad. In the Terrenoire a blast furnace for ferromanganese is to be erected at the Besseges works. The Meurthe and Moselle region is steady with Pig Iron. At the North the tendency remains decidedly upward. There is a growing demand for chains for the navy, &c. At Paris Merchant Iron is given at 20 francs, Beams at 21, large Plates 23 50, and Sheets 26.50, common. *Coal* is active and steady.

BELGIUM.

(Revue Universelle.)

BRUSSELS, Nov. 6, 1881.—*Iron.*—The Iron situation is satisfactory, as heretofore, in the Liege district, there being plenty of work on hand, while prices harden gradually. Merchant Iron is held on the basis of 13.50 francs. At Charleroi orders continue to be received with the utmost regularity, the only difficulty is to get them executed as fast as people giving them would wish to see them filled. The chances are that there will be no slackening in the receipt of orders for a month to come. Should this be the case, a further advance in prices would seem inevitable. Merchant Iron in that quarter is worth 13.50 @ 14 francs as a basis. As for the general tendency in the Iron market in Belgium, it remains favorable and there is reason to believe that it will continue so for some time to come. Everybody in the branch is busy, nor is there any lack of fresh orders; our works have indeed got as much business as they can attend to. This being the case, we see no reason for uneasiness about the future; some people, nevertheless, persist in perceiving some black spots on the horizon, but we do not share in their unfounded apprehensions. It seems to us, however, that Old Rails are run up among us to extravagant figures, say 99 @ 100 francs; the demand for them comes chiefly from abroad, principally, we hear, from the United States, where the Iron industry must be in a very flourishing condition if it can pay us that much for our old material. The Luxembourg syndicate has not dissolved as had been rumored; only the Ars works have separated from it. It will remain in force all the way to December 21, 1883. *Coal* is firm.

THE COAL MOVEMENT IN BELGIUM—FIRST NINE MONTHS.

	1881. Tons.	1880. Tons.	1879. Tons.
Importations.			
Coal	708,400	642,059	524,520
Coke	16,606	19,831	9,754
Exportations.			
Coal	3,077,660	3,214,503	3,140,026
Coke	662,458	529,944	467,228

GERMANY

(Borsenhalle.)

HAMBURG, Nov. 3, 1881.—*Iron.*—We receive the ensuing weekly report from our correspondent at Dortmund: "The Iron branch has kept its favorable attitude during the week under review, although the elections have somewhat interfered with receipts. The temporary depression in the Scotch and Cleveland market has not influenced our district in the least. This is easily explained by the many domestic and foreign orders here, particularly for railroad material and the many commands for the same in prospect. Production of Pig, especially Gray and Spiegeleisen, has to be pushed to the utmost to satisfy the demand. The blast furnaces could with ease at this moment sell to arrive their entire output to the month of April and beyond this, but they prefer to hold back, in hopes of doing better still after a while. Above two products, as well as Foundry Pig, remain unaltered, but Dortmund Bessemer Pig, in response to English Bessemer advices, tends upward. As for our rolling mills they are virtually overwhelmed with commands, and most of them have plenty of occupation all the way into the coming year. A great drawback from which they and kindred branches suffer is the insufficiency of coal freight cars, which causes them a lack of coal supply; a most irritating delay is thus created. It is a downright calamity. Prices of Merchant Iron, Sheets and Drawn Wire are exceedingly firm, but no actual advance therein can be put on record. The basis for Rod Iron is 130 marks. Prime Coarse Sheets, 205 @ 210. Very particularly on the increase are orders at the Bessemer Steel Works, and Steel Balls have been raised to 163 marks per ton at the Hanover adjudication. Orders for Steel Hoops and Axles are plentiful too. As for the remaining branches we may mention, for being quite busy, the boiler shops, machine ditto, foundries and hardware and tool manufactories. Most of the bridge-building establishments, on the other hand, are less satisfactorily situated. The locomotive and car works are in a rather better position, inasmuch as the Rhenish-Westphalian railroad will increase its stock of locomotives and cars in the near future. The line on the right banks of the Rhine made a commencement for the week with an order for 20 freight locomotives. This will give a lift to the branch in this vicinity. Coal rises in consequence of the lack of conveyance." From Italy orders for railroad material have arrived in Rhenish Westphalia during the last few days to the extent of 31,000 tons. In Upper Silesia Pig Iron is very firm. The rolling mills have sold their entire output for the first quarter in 1882. Metals are unchanged except Spelter, which rapidly advances at Breslau.

HOLLAND.

(Kooh & Vlierboom.)

ROTTERDAM, Nov. 8, 1881.—*Tin.*—Speculators have pushed the price of Banca all the way up to 60 guilders per 50 kilos., and Billiton to 59.75. Since then the market has quieted down again, and the metal is easier at above figures. The general impression is that we shall go higher still.

ITALY.

(Diritto.)

ROME, Nov. 6, 1881.—The government has just published some statistics of mineral production in Italy, according to which there were mined last year 234,000 tons of Iron Ore, worth 3,050,000 lire or francs; there were made 2000 tons of Steel, worth 1,000,000 francs, and 49,000 tons Merchant Iron, worth 2,640,000. In 1879 the latter was represented by 3,000,000 francs: Lead, 11,000,000 francs; Spelter, 4,500,000 francs; Copper, 2,000,000 francs; Crude Sulphur, 27,000,000 francs; and Boric Acid, 3,500,000 francs. In 1877 the aggregate mineral production in Italy was 54,000,000 francs, and it employed 40,556 operatives. Machine shops have of late years increased very much in Italy; it is estimated that without counting the government establishments they turned out last year 36,000,000 francs worth of machinery, &c., employing 15,000 operatives. Of Coal Italy produced last year only 101,640 tons, worth 1,340,000 francs, and of peat; 65,000 tons; Limestone, 20,278 tons, worth 2,650,000, and Plaster of Paris, 4600 tons, worth 900,000 francs.

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, Nov. 6, 1881.—*Iron.*—In Rod Iron another advance has taken place, the Bohemian rolling mills having raised the price half a florin per 100 kilos. These Bohemian works make the best of the situation and do not mind the advanced season. Pig Iron is also held higher. It continues quite scarce. The dull season is now upon us, nor do we expect much of a revival till the spring months. Sheets are unchanged. The demand is still tolerably active for coarse Sheets for tanks, boilers and roofs, and is quite up to the current capacity of output. The export of small Iron Tools and Hardware has lost much of its liveliness, causing prices to be, if anything, easier, with the sole exception of Nails, Bolts and Hooks steadily in request. For Locomotives fresh orders are dropping in from France. The Styrian rolling mills have at length resolved to chime in with the generally adopted raising of prices. We quote to-day: Common Foundry Pig, 46 @ 48; Gray ditto, 47 @ 50; Bessemer ditto, 50 @ 53 at the blast furnaces; and at Vienna, Merchant Iron, 115 @ 120; Bohemian ditto, 105 @ 110; Sheets for locksmiths, 170 @ 180; ditto for roofing, 180 @ 190; Boiler Sheets, 165 @ 180; ditto for Tanks, 155 @ 165; and Beams, 114 @ 120 florins per ton. *Metals.*—The market here has been tame during the week, offerings being evidently in excess of the legitimate consumptive demand for the moment. We quote toward the close: Copper, 74 @ 80 florins per 100 kilos.; Tin, 124 @ 128; Antimony, 65; Lead, 17.50 @ 20; Spelter, 19.50; Nickel, 97 @ 5 florins per kilo.; Bismuth, 11.50; Blue Vitriol, 27.50 @ 32; White ditto, 12 @ 16.50; Green, 4.50 @ 5; and Zinc White, 34 @ 45.

The Mersey Tunnel.

An engineering work of great boldness, and one which will link together the railway systems of Lancashire and Cheshire, England, now divided by the deep waters of the river Mersey, was commenced simultaneously at Liverpool and Birkenhead on October 29. The project is known as the Mersey Railway, and consists of a short railway less than three miles in length; but its engineering difficulties and commercial importance cannot be estimated by its comparative shortness. The undertaking is by no means a new one, nor is the work merely at its initial stage. It has been before the public for a good many years. The first Parliamentary powers for constructing a tunnel under the Mersey were obtained in 1866, from the designs of the late Sir Charles Fox; but it was a scheme somewhat on the model of the Thames Tunnel, to be worked by means of lifts at either end for the raising of passengers and goods to the level of the ground. The idea has since developed into a railway tunnel capacious enough to allow of three lines of rails. In 1871 the first serious effort was made to prosecute the undertaking, but various difficulties, engineering and financial, rendered its execution impossible for several years, although tentative efforts have from time to time been made to prosecute the undertaking. However, the project has now fallen into the hands of a company with large capital, and it is being pushed forward with the resolute determination to carry it to completion. The contract has been let to Mr. John Waddell, and the engineers are Mr. Brunlees and Mr. Fox, son of the originator. The tunnel is to cross the river almost at right angles, starting from the foot of James street, on the Liverpool side, a central position, and emerging close to the Woodside Ferry, at Birkenhead. On the Cheshire side it will at once form a connection with the Great Western and London and Northwestern companies, and though on the Liverpol side no present arrangements have been made for uniting it with the Lancashire railways, this is certain to be done as soon as the tunnel is ready.

It will be a work of enormous magnitude, but the difficulties seem to grow less the further the experiment is advanced. Trial headings have already been driven far under the bed of the river from either side, and these show that the geological formation is favorable to tunneling. The stratum consists of red sandstone of solid formation, with few fissures and apparently no "faults" of a kind likely to impede boring. The inpour of water, of course, is the danger chiefly to be apprehended, and the setting up of stupendous pumps is the first stage of the operations. These pumps have now been started. Shafts were first sunk on the Liverpool side to the depth of 180 feet, from which has been driven a drift for draining the tunnel works as they proceed. This trial heading has been already carried as far as the river wall at Liverpool; while on the Cheshire side a shaft of like depth has also been sunk, and the trial heading excavated to a length of 60 yards under the river bed. These shafts are each 45 feet in circumference, and serve the double purpose of pumpways and channels for lifting the *débris* of the excavations as they proceed. No material increase of water having been experienced as the work advanced, it has now been decided to proceed at once with the tunnel proper, instead of carrying an experimental drift from side to side of the river, as originally contemplated. Under the most favorable conditions, however, it is foreseen that there will be a large volume of water to be encountered, and to provide against this contingency very powerful pumps have been set up by the Sandycroft Iron Company; indeed, they are among the most powerful ever employed in such works. That on the Liverpool side is capable of raising 7,000,000 gallons of water every 24 hours; that on the Cheshire side 6,500,000 in the same time. Nothing like that quantity is now obtained in either case, the Cheshire pump working at the rate of only 1500 gallons per minute, and the Liverpool one still less. It is a notable fact that the water hitherto obtained is entirely free from salt, showing that it is land drainage, and that there is no inlet from the bed of the river. Indeed, the water on the Cheshire side comes exclusively from a land spring which has been tapped in the course of the excavations, and the engineers are confident that they will shortly be able to shut it out by tubbing. Now that the water is under effective control, the tunneling operations will be prosecuted with confidence and vigor. The additional shaft at either side of the river, through which the tunnel will be worked, is in an advanced state. They will be deep enough in a fortnight's time to commence boring the railway line; the heading on the Chelsea side has been carried forward 331 yards from the starting point, and is 60 yards under the tidal waters; on the Liverpool side it is 100 yards from the starting point and up to the river wall. Thus the work is proceeding concurrently from the two banks of the Mersey, and though it is difficult to estimate when a junction will be formed in the middle of the river, there is strong hope that two years will witness the achievement of this purpose. The tunnel will be sunk at a depth low enough to afford a safe superincumbent space between it and the river bed, and this safety is increased by the rocky formation through which it passes. The gradients of the line will be easy, and the arrangements for ventilating the tunnel will afford comfort to travelers.

Wm. P. Shinn & Co.—It will be of interest to many readers to know that Mr. Wm. P. Shinn has located in New York, and, in partnership with Mr. W. C. Andrews, prominently identified with coal, iron and railroad interests in the vicinity of Youngstown, Ohio, under the name of Wm. P. Shinn & Co., will give attention to a financial agency business. This will include selling and placing bonds and stocks, negotiating and procuring capital for the building of railways, development of mining and manufacturing properties, and generally promoting transportation and industrial enterprises. Mr. W. C. Andrews is president of the New York Steam Co., and has since 1856 been identified with the railroad, coal and iron interests of the Mahoning Valley, Ohio; as a member of the firms of Andrews, Hitchcock & Co., of Cleveland, Ohio, miners and shippers of coal; Andrews Bros. & Co., of Youngstown, Ohio, manufacturers of pig iron and shippers of coal, and as a projector and builder of railways in that valley. Mr. Andrews was also one of the projectors of and is largely interested in the Imperial Coal Co. and Montour Railroad Co., near Pittsburgh, Pa. Mr. Wm. P. Shinn is president of the New York Manganese Co., and has since 1850 been engaged in the location, construction and operating management of the Pittsburgh, Fort Wayne and Chicago Railway, Ashtabula and Pittsburgh Railway, and the Alleghany Valley Railroad, having been vice-president of the A. V. R. Co., president of A. & P. R. Co., and having filled several responsible offices in the P. F. W. & C. R. Co.; he was for five years the engineer expert of the Pennsylvania Railroad Co., charged with examining and reporting upon railroads, with a view to their purchase, lease or control by the P. R. Co. Mr. Shinn was interested in the Edgar Thomson Steel Co., Limited, and as general manager had the general supervision of the building of its extensive works near Pittsburgh, and had the business management of the company's affairs during the first four years of its manufacturing operations. He was, during 1880, president of the American Institute of Mining Engineers and is a member of the American Society of Civil Engineers. Both of these gentlemen are large capitalists and enjoy the confidence of investors. Such an agency in intelligent and responsible hands has long been needed, as much for the protection of investors as for the assistance of those seeking the co-operation of capitalists in legitimate and promising undertakings. Their offices for the present will be at No. 16 Cortlandt street.

A Peculiar Property of Matter.—The *Locomotive* says: "A good deal has been written concerning the physical properties of matter, and it would seem that, so far as our knowledge extends, the subject was well-nigh exhausted. Strange as it may appear, there is one property of the most common substance with which the machinist has to do that has never been accounted for, or in any way alluded to, in works on this subject. We refer to that peculiar property of cast iron by virtue of which, when in the condition of old cylinders, pieces of pipe, safety valves, and a multitude of other forms, it manages to get exactly in the way of every man in a good-sized machine shop, and at about the same time. Practical men know this to be a fact, and are looking to science for an explanation. It has long been reasonably well established that in a shop where the custom is to preserve such things, notwithstanding they may be relegated to some particular corner devoted to their preservation, they will find a way to get themselves distributed all over the shop without any very serious delay. It would be a valuable acquisition to our present knowledge to know why this is so. While carrying on the investigation necessary to determine what particular property enables inert matter to get away with the best intentions of proprietors, foremen and workmen, it might be well to conduct it with a view to finding out what property could be added to cast iron so that it would be possible to get useless scrap from the machine shop into the cupola. There is a broad field here for scientific investigation, and in a direction where there can be no possible clashing of theory and practice, the latter having virtually withdrawn from the contest." We think a satisfactory explanation of the phenomenon above noted is found in the law of the "total depravity of inanimate objects."

Fire Gilding.

In fire gilding, gold is dissolved in mercury, forming an amalgam, which is spread upon the article to be gilded. Heat is then applied and the mercury is drawn off, leaving the gold firmly attached to the metal. The quantity of gold applied by this process is greater than by many others, and the coating is more durable and is said to be more beautiful. If the work to be gilded is silver, it is to be carefully cleaned with ammonia and water by means of a brush, until the surface is bright all over and no signs of tarnish can be seen. Cleaning with acid is often recommended. The amalgam, or combination of gold with mercury, is formed by putting four parts of mercury in a clean iron ladle and adding one part of gold. It is usual to make the mercury hot before adding the gold, which is also heated by some workmen. The metals are then carefully stirred until the mixture is perfect; the amalgam is then poured out upon a plate and is then ready for use. The amalgam is next rubbed upon the article to be gilded by means of a piece of dry cloth, an even coating being given.

The next step is to drive off the mercury by heat and leave the gold. This is done by exposing the article upon an iron plate to the heat of a charcoal fire. No draft is used in this process. The regular platers are very careful to turn the article about, and, as the process goes on, to brush the amalgam so that all parts are equally well coated. The mercury fumes are very dangerous, and a plate of glass was always used by workmen in the old times to protect the face, while the charcoal fire was so placed that the fumes, as far as possible, were conducted up a flue or chimney. It is said to be a very difficult matter to obtain an even and thin coating. If one is willing to use a small extra quantity of gold, we suppose that a coating can be obtained, which, though irregular in thickness, will show of one color. The quantity of gold needed for work of this kind is exceedingly small. The coating is not, however, as thin as that produced by the electro-plating method, where the amount appears to be merely nominal—so small, indeed, in some cases as not to be perceptible in weight.

If the quality of the gold makes no difference, a very pure coating may be put on by amalgamating the surface of the metal with pure mercury, and then covering all portions to be gilded with the gold foil or gold leaf used by dentists. The mercury is drawn off by heat, and the gold remains behind. The coating in this case is pure gold, and we suppose is very soft. On this account we should presume it would wear rapidly. The best quality of ordinary leaf could be used the same way, but it would have this disadvantage, that, being very thin, several leaves would be required, one on top of the other, to cover a given surface.

The "fire" methods of gilding, as they are called, are well worth attention at the present day from those who wish for something more than a "blush" of gold upon their work. The tendency of the day is to make plating too thin, and a gold-plated harness with $2.50 worth of gold upon it is said to be heavily plated, and $20 has been charged within ten years for putting on this amount of gold.

The following table, showing the increase in the coal product of the world during the last 10 years, may prove interesting to some of our readers:

	Tons—1870.	Tons—1880.	Increase Tons.	Per cent.
Great Britain..	107,506,683	147,000,000	39,493,317	37
United States .	28,000,000	63,500,000	35,500,000	127
Germany.	26,774,000	42,161,000	15,387,000	58
France.	13,509,000	18,857,000	5,348,000	35
Belgium.	12,044,000	14,000,000	1,957,000	82
Austria.	4,100,000	6,000,000	1,900,000	46
Russia.	568,000	2,200,000	1,632,000	275
Spain.	550,000	750,000	200,000	36
	193,970,683	294,468,000	100,497,317	52

Some years ago a vessel was patented by the late Capt. Moody as a sea refuge and telegraph ship, to be used on the mid-Atlantic. The form of the vessel very much resembled the ace of clubs, with a fourth leaf instead of a stalk. Capt. Moody had a model of this vessel built 40 feet over all, which was purchased of his executors and is now used as a residence for water bailiffs to watch certain fisheries on the Norfolk coast of England. It recently rode out a hurricane without shipping a drop of water, although all other vessels in the neighborhood either foundered or came ashore. The peculiarities of the vessel are that it rides more upright than a sharp-bottomed ship; and, being moored with four anchors and cables, it is well adapted for a telegraph ship, as it does not swing with the tide or wind. It is also better able to carry a short, flexible cable from the main telegraph cable on the bottom of the sea. Such a vessel moored at a distance of several hundred miles from the shore and having a telegraphic connection with it, might render valvable services in giving warning of approaching storms.

The following table giving the number of miles of road worked and locomotives owned, and the miles of road per locomotive, for several of the prominent lines in England and the United States, may prove of interest to our readers:

Name of road.	Miles of road open.	No. of locomotives.	No. miles of road per locomotive.
ENGLISH LINES.			
Great Western.....	1,550	2,147	0.72
London & Northwest'n	1,716	2,182	0.78
Midland	1,518	1,716	0.88
Northeastern..... ...	1,364	1,490	0.91
Great Northern.....	659	601	1.09
AMERICAN LINES.			
Pennsylvania..... .	1,120	627	1.79
New York Central....	1,018	639	1.59
New York & New H...	202½	97	2.09
Chicago, Burlington & Quincy	2,772	441	6.28
Lake Shore.....	1,178	494	2.38

From these figures it will be seen that one of the above English lines has a locomotive for less than three-quarters of a mile of road, two others for less than seven-eighths of a mile, and one for less than a mile.

Hydraulic Machinery on Shipboard.

Messrs. Brown Bros. & Co., of England, have recently fitted up the steamship Quetta with the most elaborate and complete set of hydraulic machines ever put into a ship. A pair of engines, capable of working up to 100 horse-power, is employed to maintain a constant water pressure of 700 pounds on the square inch, kept under a steam accumulator, and from the accumulator pipes are led to all parts of the ship where power is required. The Quetta belongs to the British India line, and has a gross tonnage of 3302 tons. On the forecastle is a 15-ton hydraulic capstan, driven by four pendulous hydraulic cylinders, collectively of 50 horse-power. A similar but less powerful capstan is placed at the other extreme end of the mains on the poop. The ship is steered from the bridge amidships by a wooden tiller similar to that of a small yacht. By moving the tiller a slide valve is opened, which is in connection with the hydraulic rams and cylinders aft. When the valve is opened to either port or starboard cylinder, a corresponding movement of the rams and rudder takes place, strictly controlled, however, by mechanism which prevents the helm from running away from the steersman. The rudder itself is connected with the rams in such a way that the latter obtain an increasing leverage as the rudder is put hard over, when the leverage is, of course, most needed. A hydraulic cylinder, with a similar arrangement of valve and automatic controlling levers, is applied to the main engines, by which they can be reversed or stopped in three seconds by a single reversing lever. The water-tight door of the shaft tunnel is also opened and closed by a hydraulic cylinder, the valve of which is near the deck, so that in the event of an accident this door can be instantly closed. In the stokehole close by, is fixed a hydraulic hoist for lifting the ashes. The most valuable application of the Quetta's hydraulic machinery is to the loading and unloading of the cargo. It may be mentioned that at Colombo, in the course of the single voyage which the Quetta has already made to Calcutta and back, 1250 tons of rice were discharged in 10 hours. On the Quetta's deck there are four hatches. Those at the extreme ends fore and aft are fitted with single hydraulic hoists, the two main hatches having double hydraulic hoists. Each of these hoists is capable of raising a ton and a half through a hight of 70 feet at a speed of 5 feet per second. The hoists consist of hydraulic rams, fitted into cylinders, and working through stuffing boxes. Each ram is connected to three chain pulleys, while the other three are carried by the cylinder base-plate. A foot of rise in the ram raises the load 6 feet. The water is admitted to the cylinder by a slide valve worked by a single lever, whereupon the load is lifted, while, by reversing the lever, the water is allowed to escape and the load to descend. An ingenious arrangement prevents the load from running from one extremity to the other, through the unskilfulness of the driver, and thus risking damage to the cargo. A wholly inexperienced man can thus work the apparatus without any danger. The hoists will discharge cargo at the highest speed of 5 feet per second and be brought to a state of rest automatically at any position required. To summarize the advantages of the Quetta's hydraulic machinery, a pair of engines in one place do, with no noise and half the consumption of fuel, the work usually performed by, perhaps, a dozen donkey engines, while about £30 or £40 a voyage is saved in wear and tear. The increase of speed obtained in loading and discharging cargo practically insures a quicker voyage. The rapidly-working machinery necessitates double gangs of men in the hold; but, though the hands are more numerous, they are paid for a shorter time, and the cost of labor per ton of cargo is thus less than usual. The prime outlay is considerably greater than under the ordinary system; but it is calculated that in, at most, three years the extra expense will have been saved.

Influence of Sun Spots upon Temperature.—J. Liznar has compared the observations at St. Petersburg, Caterinenburg, Barnaul, Prague, Brünn, Vienna, Kremsmünster, Trieste, Rome, Calcutta, Batavia and Hobarttown, and finds marked evidence of a relation between the oscillations of daily temperature and of sun spots. The minima of daily oscillation correspond very closely with the maxima of sun spots; the maximum of oscillation precedes the minimum of sun spots by about two years. In the annual temperature the maximum of spots corresponds to the maximum of oscillation, and the minimum of spots to the minimum of oscillation.

The nature of the manufactures in the Royal Gun Factory, England, necessitates the turning of very large and heavy masses. Lathes have therefore been designed and completed in this department remarkable for magnitude and power. They can deal with weights up to 200 tons, and are sufficiently powerful to reduce by 6 inches at a single cut the diameter of a 12-foot tube. These lathes have the following dimensions: 8 feet centers, 60 feet beds. There are nearly 200 tons of material employed on each of them, and the maximum power of their gearing is 150 to 1.

Prof. O. N. Rood, of Columbia College, recently described in a number of the *American Journal of Science*, a modification of the Sprengel pump, by which he has been able to obtain a vacuum of 1-390,000,000th without finding that the limit of its action had been reached.

Large deposits of asbestus are said to have been discovered in South Carolina, the mineral being but a short distance below the surface. Immediately following the asbestus, apparently inexhaustible quantities of soapstone have been found, promising a copious supply for many years.

London Fire Department.

American readers who are familiar with any of the well-organized fire departments peculiar to our larger cities, will doubtless be surprised when told that the great city of London is not provided with the telegraphic fire system or many of the other precautionary measures common to our practice. The following, taken from a recent number of the *Ironmonger*, presents an interesting comparison between the fire departments of London and New York, and we commend it to the attention of our readers:

The numerous and serious fires in the city of London within the past few weeks have caused the Commissioners of Sewers to once more take into consideration the question of providing more efficient protection against casualties of that description. Although the wealthiest and most populous city in the world, London is probably more exposed to the risk of serious conflagrations than any other large center of population in Europe or North America. The city proper, with its great blocks of buildings and rich stores of merchandise, is peculiarly vulnerable in this respect, although in many other particulars it is by far the best-governed portion of the metropolis. It is peculiarly weak in the matter of fire-extinguishing appliances, having only two engines and thirteen men permanently stationed within its limits. A number of hydrants have been provided, it is true, within the past three years, but these are said to be of limited utility, owing to the fact that they cannot be opened until the arrival of the firemen. In this respect Liverpool, Manchester and other large provincial towns are undoubtedly ahead of London, and that is also the case as regards the supply of water in conjunction with the fire-extinguishing appliances. It is an admitted fact that the first few minutes of a fire are of the highest importance. More may be done in five minutes after the breaking out of a fire than in as many hours after it has once got hold. It is, therefore, extremely advisable that arrangements should exist to enable the fire brigade to be promptly communicated with, and to insure their immediate attendance when their services are required. In New York and other American cities this result is insured by the general use of a simple and relatively inexpensive system of electric fire alarms. Wires are led from dwellings and places of business to the district fire engine station, and an alarm can thereby be given almost simultaneously with the discovery of the fire. The horses stand ready harnessed, and are released by the sending of the electric current which gives the alarm; hence the engine and firemen may be on the way within a minute after the receipt of the call. The telephone might be easily utilized in a similar manner. One of the two methods should certainly be adopted by the city authorities without delay, after which, with an efficient brigade, they might feel reasonably secure from the probability of any recurrence of those serious fires which have not only disgraced London, but have also destroyed a vast amount of valuable property.

The Allen Paper Car Wheel Company have turned out of their Hudson works, during the 10 months ending November 1, 1881, 7729 wheels. They are still adding to their machinery, and hope to increase the output at Hudson to 10,000 wheels the coming year. They are also pushing forward their improvements at the Chicago works as rapidly as machinery can be procured. When fully completed, these works are expected to have double the capacity of those at Hudson. The extensive paper mill, lately erected by this company at Morris, Ill., is very nearly ready for operation, and it is expected to be running by the 1st of January, 1882. It will have a capacity of from 4000 to 5000 tons a year. This company is now working on orders for the Mexican companies, the Atlantic and Pacific Railroad, the Central Railroad of New Jersey, the Delaware, Lackawanna and Western Railway, the Delaware and Hudson Canal Company, the Lehigh Valley Railway, and the Atchison, Topeka and Santa Fe Railway, with large additional orders in sight.

The largest torpedo boat afloat left England for Copenhagen a few days since, having been built to the order of the Danish Government by Messrs. Thornycroft & Co. Her displacement is 55 tons, or 40 per cent. more than that of the largest torpedo boats in the British service; but her dimensions are still within the limit which will permit her to be conveyed by rail from one part of the coast to another. Her armament is exceedingly formidable, consisting of four of the largest Whitehead torpedoes, each of which carries a charge of 80 pounds of gun cotton, in addition to which she mounts a Hotchkiss revolving gun. She has a coal capacity of 10 tons, estimated as equivalent to 1200 miles at a speed of 11 knots, and her full speed, as shown at the trial, as well during a run of three hours at the measured mile, is 20 knots, which is 2 knots in excess of the stipulation.

At the Eston Steel Works, England, very large quantities of steel rails are being made, the total amount in some weeks reaching to as much as 4000 tons. This is the produce of eight converters and two rail mills. There is another rail mill which is kept in reserve in case of accident to either of those at work. The works are now lighted up regularly by means of electricity. The lamps in use are of several different kinds, and supplied by several rival manufacturers. They are all under probation, and when it is clear which kind is most successful, that kind will be adopted throughout. The electric light has also been applied to the works of Messrs. Johnson & Reay, of Stockton-on-Tees. The Brush light was for some weeks in operation at Messrs. B. Samuelson & Co's Newport iron works, but for some season or other they did not appear to work satisfactorily and were removed.

Swedish iron continues to compete with success against English iron in Java. France and Belgium, too, are enjoying a share of the large orders for machinery for the sugar, coffee and tea plantations, although the great majority go to Great Britain.

BRACKET SAWS

are now a staple article in all Hardware Stores. They make trade lively about Christmas time, when it would otherwise be dull. The demand is such that any dealer can sell a few if he has them in stock. During the past six years a great number of saws have been put on the market, of more or less merit, but at present the demand is almost wholly for the Lester and Rogers Saws. The Lester Saw with all of its attachments sells for $10.00, and the Rogers Saw for $3.50. These rates seem low, but we are able to sell at such prices Saws which give entire satisfaction, with no come-back on the Dealer.

We are also Headquarters for Saw Blades, Wood, Designs, and all things pertaining to the Bracket Sawing business.

A fair discount to the trade.

MILLERS FALLS CO., 74 Chambers St., New York.

HEATON & DENCKLA HARDWARE CO.,

Hardware Commission Merchants,

507 Commerce Street, Philadelphia.

E. & G. BROOKE'S "Anchor Brand" Nails, Brads, Spikes, &c.
MALLORY, WHEELER & CO.'S Door and Pad Locks.
UNION MANUFACTURING CO.'S Butts.
AMERICAN SCREW CO.'S Screws.
D. R. BARTON TOOL CO.'S Edge Tools, &c.
FRANCE'S Shutter Holders.
Anti-Window Rattlers, Brass and Nickel-Plated.
WESTERN FILE CO.'S Cast-Steel Files.
AMERICAN SHEAR CO.'S Shears and Scissors.
HP NAIL COMPANY'S Wire, Steel, Iron and Brass Nails and Barbed Nails.
STEELE & SONS' Wrought Handle Sad Irons.
EXCELSIOR MILLS. Genuine Turkish Emery.
BROWN & BRO.'S Silver Plated Spoons and Forks.
GAYLORD MANUFACTURING CO.'S Till, Chest and Cupboard Locks.
AMES' Genuine Chester Emery.
COLWELL & COLLINS, NORWAY BOLT CO., Norway Carriage and Tire Bolts.
PLYMOUTH MILL CO.'S Black and Tinned Iron Rivets.
AMERICAN MACHINE CO.'S Fluters, &c.
STUART PETERSON & CO.'S Tinned and Enameled Ware, &c.

Also a large line of Heavy and Shelf Hardware.

VARIETY IRON WORKS.

KYSER & REX,

Manufacturers of

Hardware Specialties, Iron Toys, Novelties and Housefurnishing Hardware,

Main Office and Factory, Trenton Ave. and Margaretta St., Frankford, Philadelphia.
Branch Office, 19 & 21 S. 4th St., Phila. Hardware specialties manufactured to order.

Kieser's Gem.

Double Shearing Cut. Solid Cast Steel Blades.

Patented Sept. 14, 1880.

Family Meat Cutters are the best made.

Every family should have one. Will thoroughly cut Raw or Cooked Beef or Pork, Vegetables, Cocoanuts, Pine Apples, &c, Will cut forty pounds sausage meat an hour.

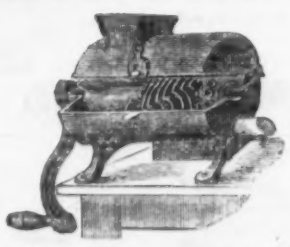
Every Druggist should have one for cutting Roots, Vanilla Beans, &c.

Easily worked. Easily cleaned. Will not get out of order. Ask your dealer for them.

Send a postal for Circular with testimonials.

Will send one as sample by express upon receipt of $2.00.

Kieser's No. 55



Are Made on the Same Principle as the Gem Meat Cutters,

But with capacity to cut 100 pounds Pork an hour.

Will send one as sample on receipt of $3.00.

Our **No. 1 Butcher,** for hand or power, will cut 300 pounds an hour.

Our **No. A Butcher** for power, will cut 1000 pounds an hour.

We warrant our Cutters to do the work more thoroughly than any other machine made.

Also Sole Manufacturers of

KIMBALL'S PATENT SHOVELS & SPADES,
BOSS PATENT MOLASSES GATES,
LOCKWOOD'S PATENT HOES.

KIMBALL SHOVEL CO.,

Office, No. 67 German St., Baltimore, Md.

THE "MOUNT CARMEL" OX SHOE.

Five Sizes.

Steel Toe Calk.

FINISHED READY FOR NAILING ON.

WARRANTED

The Best and Cheapest Shoe Made.

IVES, WOODRUFF & CO.

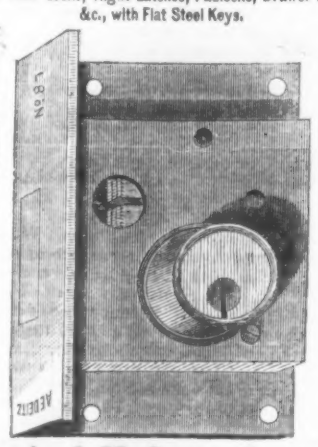
Manufacturers,

MOUNT CARMEL, CONN.

For sale by dealers in blacksmiths' supplies.

A. E. DIETZ,

(Successor to Barnes & Deitz,)
Manufacturer of
Store Door Locks, Night Latches, Padlocks, Drawer Locks, &c., with Flat Steel Keys.



Durrie & McCarty, Agents,

97 Chambers & 81 Reade Sts., New York.

THE FORSYTH SCALE CO.,

YOUNGSTOWN, O.,

Manufacture a full line of

FORSYTH'S STANDARD SCALES,

Counter, Portable, Dormant, Stock and Hay, and R. R. Track

SCALES.

Call Special Attention to their

SUSPENSION HAY & R. R. TRACK SCALES.

Also, Warehouse Trucks and Letter Presses.

PRINCIPAL WAREHOUSES,

DURRIE & McCARTY, New York;
FORSYTH SCALE CO., Chicago;
SIMMONS HARDWARE CO., St. Louis.

PRIZE MEDALLISTS:

Exhibitions of 1862, 1865, 1867, 1872, 1873, and only award and medal for Noiseless Steel Shutters at Philadelphia, 1876; Paris, 1878, and Melbourne, 1881.

CLARK, BUNNETT & CO.,

LIMITED,

Late CLARK & COMPANY,

Original Inventors and Sole Patentees of

Noiseless Self-Coiling Revolving

STEEL SHUTTERS,

FIRE AND BURGLAR PROOF. ALSO IMPROVED

ROLLING WOOD SHUTTERS,

Of various kinds. And Patent

METALLIC VENETIAN BLINDS.

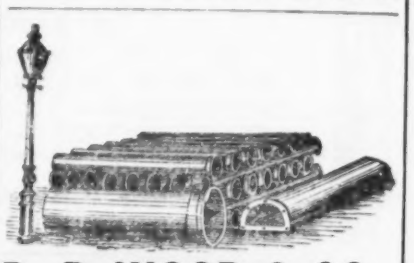
Endorsed by the

Leading Architects of the World.

Send for Catalogue.

Office and Manufactory,

162 & 164 West 27th St., N. Y.



R. D. WOOD & CO.,

Philadelphia,

Manufacturers of

Cast Iron Pipe

FOR WATER AND GAS,

Lamp Posts, Valves, &c.,

Mathew's Pat. Anti-Freezing Hydrants.

400 CHESTNUT STREET.

THE CLIMAX SASH CORD.

Patent Applied For.

A COILED STEEL WIRE CORD

for suspending all sizes of Window Sash, Gates, Doors and similar contrivances. Runs over any pulley.

More Simple, Durable and Economical than any in use.

Send for explanatory circular and price list.

The Perpetual Tension Propelling Belt Co.,

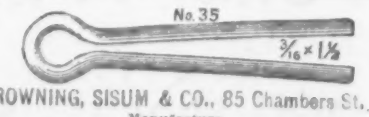
Sole Manufacturers of

Gear's Patent Coiled Wire Belting, Climax Sash Cord, and Perfect Door Springs,

328 & 330 7th Av.,

NEW YORK.

THE BEST IN THE WORLD.

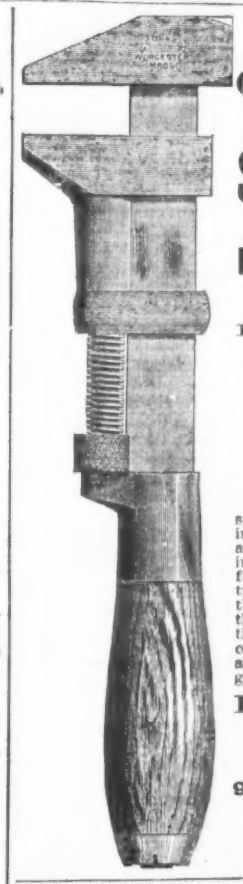


BROWNING, SISUM & CO., 85 Chambers St.,

Manufacture

Belt Hooks, Cotters, Spring Keys, D Rings, Staples, and everything pertaining to wire bending.

Factory, BROOKLYN.



L. COES'

Genuine and Mechanics

PATENT

Screw Wrenches

MANUFACTURED BY

L. COES & CO.,

Worcester, Mass.

ESTABLISHED IN 1839.

Our Genuine Wrenches are made with straight bars, full width and enlarged jaw, having ribs cast inside, which strengthen the jaw and give a full bearing on front of bar. These improvements, in combination with our new ferrule, made with double bearings, an iron tube, fitted to the shank and resting against the lower bearings, rigidly held in position by the handle and nut, effectually preventing back thrust of ferrule (see sectional view), verify our claim that we manufacture the heaviest and strongest Wrench in the market. None genuine unless stamped

L. COES & CO.,

Worcester, Mass.

Warehouse,

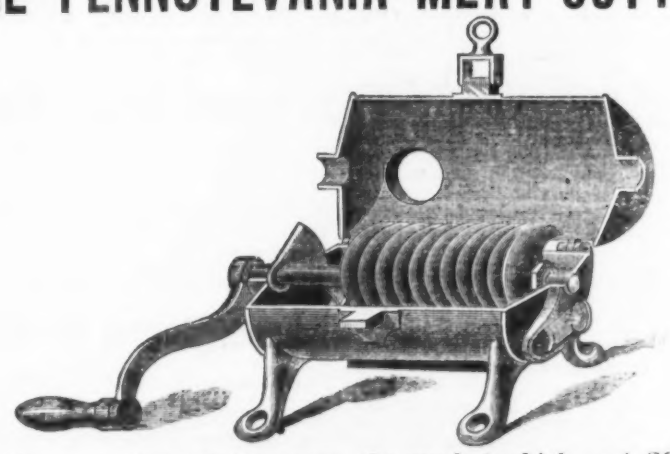
97 Chambers and 81 Reade Sts.,

NEW YORK.

DURRIE & McCARTY,

Sole Agents.

THE PENNSYLVANIA MEAT CUTTER



Has the capacity of Cutters upon the market which cost 20 per cent. more money.

PRICE LIST.

No. 1, containing 8 Steel Knives ..... per dozen, $24.00
No. 2, containing 11 Steel Knives ..... " 28.00
No. 3, containing 12 Steel Knives ..... " 36.00
Nos. 1 and 2 are packed ½ dozen in a box; No. 3 packed ¼ dozen in box.
Discount to the trade 50 per cent. Orders solicited.

LLOYD, SUPPLEE & WALTON, Philadelphia.
DURRIE & McCARTY, New York City.

CHAMPLAIN
Forged Horse Nails.

MANUFACTURED BY THE

NATIONAL HORSE NAIL CO.,

Vergennes, Vermont.

HOT FORGED AND COLD HAMMERED POINTED. MADE OF BEST NORWAY IRON AND WARRANTED.

A full line of "CHAMPLAIN" and "NATIONAL" Nails always on hand at our Warehouse,

97 CHAMBERS AND 81 READE STREETS, NEW YORK.

DURRIE & McCARTY, Sole Agents.

NEW LINE.

WITH SHELL EJECTOR

30, 32, 38 and 44 Cal.

Pocket, Police, Navy and Army Sizes. Also, Double and Single Shot Guns. Rifles, Cartridges, Shells, Bullets, Primers, Loading Implements, &c., &c.

Send for reduced catalogue and discounts of goods manufactured by

E. REMINGTON & SONS,

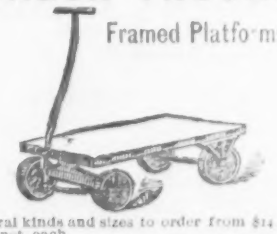
283 Broadway, - - - - NEW YORK.

PENFIELD BLOCK CO.,

Lockport, N. Y.

WAGON TRUCKS.

Framed Platforms.



"ACME"

FENCE WIRE STRETCHER.

Simple, Effective, Cheap. White Ash Handle three feet long. Price per doz., net, $9.00.

For further particulars write the Factory or

HENRY B. NEWHALL,

105 Chambers Street,

NEW YORK AGENT.

Several kinds and sizes to order from $14.00 to $20.00, net, each.

For Stores, Markets, Warehouses, Factories,

S. H. & E. Y. MOORE,

163 & 165 Lake Street,

CHICAGO AGENTS.

Subterranean Heat.

Following are the temperatures of the ground in the Forman shaft, from the surface to the depth of 2100 feet, as ascertained by drilling holes not less than three feet into the rock, and inserting a Negretti & Zambra slow-acting thermometer (of the pattern adopted by the Underground Temperature Committee of the British Association, and standardized at Kent), into the hole, closing the hole with clay and leaving the thermometer for 12 hours, not less than three holes being tried at each point:

Depth. Feet.	Temperature. Degrees.	Depth. Feet.	Temperature. Degrees.
100	50½	1200	89¼
200	55	1300	92½
300	62	1400	96½
400	60	1500	101
500	68	1600	103
600	71½	1780	104½
700	74¾	1800	105½
800	76½	1900	106
900	78	2000	111
1000	81½	2100	119½
1100	84		

It will be seen by the above that, although there is on the whole a steady increase of temperature as depth is attained, the increase of temperature is not regular. For instance, the rock at the 400 is two degrees cooler than at the 300 level; between the 400 and 500 levels there is a difference of eight degrees, while in other places an additional depth of 100 feet shows but a slight increase in the temperature. Thus at the 1800 level the temperature is 105½ degrees, while at the 1900 it is but 106 degrees, an increase of but one-half a degree. This difference is undoubtedly owing to the character of the rock at the points where the holes were made; therefore it would be of great interest to have, in connection with the temperature, a description of the rock; not only the kind of rock, but also the nature of the same, whether carrying much lime, gypsum or iron pyrites. It would probably be shown that where there was much lime there would be an increase of heat not warranted by the increased depth, and the reverse where lime was absent.

The Weaver Differential Governor for Water Wheels.—This governor is constructed on a new and radically different principle, and is claimed to be an improvement over all predecessors. The revolving balls are there to be sure, but not as regulators, only as indicators of the actual speed of the motor. The motion is perfectly positive—no dependence on centrifugal pumps or columns of oil—and, being a gear motion, is strong enough to handle the difficult gate with ease. It is cheap and durable, and will not wear out, because its motion is always in one direction. It does not vibrate above the point of adjustment, for it approaches it with decreasing speed, both in opening and shutting the gate, and, finally, after it is once adjusted to the wheel, workmen cannot increase or diminish its speed, except by putting on different gears. One positive merit is that when the gate is full open the governor unships itself, and the instant less power is used it ships itself in and commences putting water off. It does the work, quick or slow, as desired.

Before a French society of gas engineers, M. Brémond has resumed the discussion of a subject treated by him three years ago, viz., the effect of altitude upon the illuminating power of gas, formulating the general law that, by reason of rarefaction of air, "gas loses at least one liter of illuminating power per 50 meters of altitude." He gives the details of an interesting experiment made on the Northern Railroad of Spain, observations being taken at various altitudes on the way from Madrid, 595 meters above sea-level, to La Cañada, a station 1373 meters above sea-level. We cannot enter into the details of these trials; but we may give a general idea of the effect of altitudes upon illuminating power by citing the following table, in which Paris is taken as a unit of comparison:

City.	Altitude. m.	Barometric pressure, mm.	Illuminating power.
Paris	0	0.754	105
Vienna	68	0.747	103
Moscow	235	0.732	99
Madrid	573	0.705	87
Mexico	2,212	0.572	30

The Iron Age Directory

and Index to Advertisements.

NEW YORK WHOLESALE PRICES, November 22, 1881.

METALS.

PIG IRON.—DUTY Bars, 1 to 1½c ₩ lb; Sheet, Band Hoop and Scroll, 1¼ to 1¾c. ₩ lb; provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 ₩ ton; Polished Sheet, 3c. ₩ lb; Wrought Scrap, $8 ₩ ton; Cast Scrap, $6 per ton. Railroad 70c. ₩ 100 lbs. Boiler and Plate, 1½c. ₩ lb.

Iron—AMERICAN		
Foundry No. 1X	₩ ton	$25.00 @ 26.00
" No. 2X	₩ ton	23.00 @ 23.50
Gray Forge	₩ ton	22.50 @
SCOTCH.		
Eglinton	₩ ton	23.00 @
Carnbroe	₩ ton	24.00 @
Coltness	₩ ton	26.00 @ 26.50
Glengarnock	₩ ton	24.50 @ 25.00
Gartsherrie	₩ ton	24.00 @ 26.00
Rails.		
Iron, at mill	₩ ton	$48.00 @ 50.00
Steel (at mill) (1882 delivery)	₩ ton	60.00
Old Rails T's	₩ ton	29.00 @ 30.25
Old Rails D H	₩ ton	31.50 @ 32.00
Scrap.		
Wrought Scrap ₩ ton, from yard		32.50

Bar Iron, from Store.—

Common Iron:		
⅜ to ⅞ in. round and square	₩ lb	2.70
1 to 6 in. x ⅜ to 1 in.	₩ lb	
Refined Iron		
⅜ to 2 in. round and square	₩ lb	3.00
1 to 6 in. x ⅜ to 1 in.	₩ lb	
1 to 6 in. x ¼ and 5-16	₩ lb	3.10
Rods—⅜ and 11-16 round and square	₩ lb	3.00
Bands—1 to 6x3-16 to No. 12	₩ lb	3.40
Norway Nail Rods		6¼ @ 6½c

Sheet Iron.

	Common American	R. G. American.
Nos. 10 to 20	₩ lb 4	5
" 21 to 24	₩ lb 4½c	5
" 25 to 26	₩ lb 5 c	5¼
" 27	₩ lb 5 c	5¼
" 28	₩ lb 5½c	5¾

	B.B.	2d qual.
Galvanized, 10 to 20	₩ lb 8½c	7½c
" 21 to 24	₩ lb 9½c	8 c
" 25 to 26	₩ lb 10 c	8½c
" 27	₩ lb 10¾c	9 c
" 28	₩ lb 11½c	9½c
Patent Planished	₩ lb 10½c	B. 9½c
Russia		11 @11½c
American Cold Rolled	₩ lb 5	@7½c

COPPER.—DUTY Pig, Bar and Ingot, 5c; Old Copper 4c ₩ lb. Manufactured (including all article of which Copper is a component of chief value), 45 ₩ ad valorem.

American Ingot	₩ lb See Trade Report

SHEATHING BRAZIERS COPPER, BOLTS, &c.

Braziers' Copper, ordinary sizes, 16oz. per sq. ft., and over per lb	28c
Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz., ₩ sq. ft.	₩ lb 30c
Braziers Copper 10 oz. and 12 oz., ₩ sq. ft.	₩ lb 32c
" Lighter than 10 oz. ₩ sq. ft.	₩ lb 34c
Circles less than 24 in. in diameter	₩ lb 31c
Circles 24 in. diameter and over	₩ lb 34c
Segment and Pattern Sheets	₩ lb 31c
Locomotive Fire Box Sheets	₩ lb 28c
Sheathing Copper, over 12 oz. ₩ sq. ft.	₩ lb 26c
Bolt Copper	₩ lb 28c
Copper Bottoms	₩ lb 39c

No Copper is Sheathing except 14 x 60 inches and not to exceed 34 oz. to the sq. ft.

TINNING.

4X8	₩ sheet 60

All other size Sheets, 2½c. per square foot.

For tinning both sides, double the above amount

O'NEILL'S PATENT PLANISHED COPPER.—Net.

14X48

1 and 16 oz. and heavier	₩ lb	35c
12 oz. and lighter	₩ lb	38c

Boiler Sizes.

7 in., 14x62. 8 in., 14x66. 9 in., 14x60. and 16 oz. and heavier. ₩ lb 37c By the case. ₩ lb 36c

(And all sizes not over 20 in. wide.

24x48x30x60.

4 and 16 oz. and heavier	₩ lb 39c
08	₩ lb 42c

Brass.

Brown & Sharp's Gauge the Standard for Metals. Old English Gauge the Standard for Wire.

BRASS MANUFACTURERS' PRICE LIST.—dis. Nominal. June 10, 1880.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 3c ₩ lb.

HIGH BRASS.

All Nos. not thinner than to No. 28, wider than 2 in., not wider than 14 in.	30c
All Nos. to No. 26, inclusive, and widths over 14 to 20 in., inclusive	34c
All Nos. to No. 26, inclusive, and widths over 20 to 30 in., inclusive	38c

36c ₩ lb advance on each No. above Nos. 26 to 36, inclusive.

All Brass thinner than No. 8 is Platers' Brass, at	49c
Sheets 24x48, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in.	37c
Printers' Rules	45c
Sheets wider than 30 in. and under 40 in.	47c
" 40 in and over	50c
Circular Sheets, in diam. from 4 in. to 14, inclusive	30c
" " " over 14 " 20, "	45c
" " " 20 " 30, "	49c
" " " 30 " 40, "	55c
" " " 40 in.	59c

LOW BRASS.

40 ₩ lb more than High Brass,

Gilding Metal, 8c ₩ lb more than High Brass.

Platers' or Gold Metal	In Bars	48c
	Sawed	51c
	Planed or Polished	44c

FOR SLITTING.

Metal in width ⅛ in. to ⅜ in. to No. 28, inclusive, 1c. ₩ lb advance.

Metal, in width 2 in to 1 in. thinner than No. 28, 2c. ₩ lb advance.

Metal, in width 1 in. to ⅜ hinner than No ₩ lb advance.

etal, in width ⅛ in. to ¼, inclusive, not thinner than No. 28, 2c. ₩ lb advance.

Metal, in width ⅛ in. to ¼ thinner than No. 28, 5c. ₩ lb advance.

Metal, ¼ in. in width and less, 10c. ₩ lb advance.

Any of the above widths cut to particular lengths, add 7c. ₩ lb.

GERMAN SILVER MARKET METAL AND WIRE

	Market Metal.	Wire.
4 per cent., 12 inch to No. 26	$0.52	$0.70
6 " " "	.66	.78
10 " " "	.64	.88
15 " " "	.74	1.03
18 " " "	.80	1.12

German Silver Sheets over 12in. wide and weighing more than 10 lbs., $2.00 ₩ lb.

Advance 2c. for each additional inch in width above 2 in. and 2c. ₩ lb on each No. thinner than Nos. 26 to 36, inclusive.

All German Silver thinner than No. 36 is Platers, at 50c ₩ lb additional.

Germad Silver Scrap one-half less than net price of 12 in Market Metal. German Silver Turnings, Filings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Copper.
No. 0 to 20	$0.35	$0.37	$0.43
No. 21	.36	.40	.46
No. 22	.37	.41	.47
No. 23	.38	.42	.48
No. 24	.40	.44	.50
No. 25	.43	.47	.54
No. 26	.45	.49	.56
No. 27	.48	.52	.59
No. 28	.52	.56	.65
No. 29	.55	.59	.66
No. 30	.58	.62	.72
No. 31	.62	.66	.78
No. 32	.66	.70	.84
No. 33	.70	.74	.93
No. 34	.74	.78	1.03

Spring Wire 2c ₩ lb advance.

Flat, Square and Half Round Wire 50 ₩ lb advance on Round Wire.

Fancy Wire not less than 10c ₩ lb advance of Round Wire.

Brass Rods, No. 8 and larger, not less than 2 feet lengths, 36c.

Wire straightened and cut, smaller than No. 8 and not less than 2 feet lengths, 4c.

Wire and Rods less than 2 feet lengths, special rates

Twelve cents per lb extra for spooling on 1 lb spools.

MISCELLANEOUS.

Brass Pull Ears	$0.40
Brass Door Rail	.45

SCRAP.—dis. Nominal.

High Brass Scrap	12c
Low "	14c
Gilding "	16c

Turnings, Fillings and Chips half the price of Scrap.

Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis. Nominal. ₩ lb

Plain No. 2 inclusive above ¼ in. to 3 in.	$0.13
" above 3 in	.53

Nos. 1, 22, 23, two cents advance on List for each Number.

Nos. 24, 25, 26, four cents advance on List for each Number.

Above No. 26, special rates.

Plain ⅛ inch	.70
" ¼ "	1.10
" ½ "	1.00

All Mandrel Drawn Tubes, 5 cents advance on List Prices.

Fancy Tubing to No 20

English, Scotch and Extra Patterns Fancy Tubing to No. 20

Tubing Sawed or Cut 2 to 4 feet long, 2 cents advance on List.

Add to 2 cent ½ cent for each additional cutting under 2 feet.

On Mandrel Drawn Tubes under ⅜ in. 2 cents per pound advance.

ZINC TUBING—dis 20 %.

Plain	.27
Fancy	.33
Scotch and Extra Patterns	.36

GERMAN SILVER TUBING.—dis 10 %

4 Per cent.	.80
6 "	.90
9 "	1.0
12 "	1.20
15 "	1.35
16 "	1.45
18 "	1.50
20 "	1.60

STEEL.—DUTY: Bars, Ingots, Sheets and Coils valued at 7 cents ₩ lb., or under, 2¼ cents; over, 7 cents, and not above 11, 3 cents ₩ lb; over 11, 3½ cents ₩ lb, and to ¾ ad val. Railway Bars, 1¼ cents ₩ lb. Railway Bars, in part Steel, 1 cent ₩ lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

For American Steel see quotations under heading of Pittsburgh.

English Steel.—		
" Best Cast	₩ lb	15½c
" Extra Cast	₩ lb	16½c
" Round Machinery, Cast	₩ lb	10c
" Swaged, Cast	₩ lb	18c
" Best Double Shear	₩ lb	15½c
" Blister, 1st quality	₩ lb	13c
German Steel, Best	₩ lb	11c
" 2d quality	₩ lb	10c
" 3d quality	₩ lb	9c
Sheet Cast Steel, 1st quality	₩ lb	15½c
" 2d quality	₩ lb	14½c
" 3d quality	₩ lb	12½c

ANTIMONY LEAD.—DUTY Pig ₩ 100 lbs; old Lead, 1½c ₩ lb Pipe and Sheet, 2½c ₩ lb.

American	5½ @ 5¾c
Bar	60 net
Pipe	7½c dis 10 %
Tin Lined Pipe	10c, dis 10 %
Sheet	8c, dis 10 %
Shot	Drop 7c, Buck, 8c
Chilled Shot	8c

BABBITT METAL.

N. P. U.	₩ lb 40
A. 250: B, 200: C, 150.	

TIN.—DUTY: Plates, Sheets, Tagger and Terne, 1.1c ₩ lb; Electro-galvanized Plates, 2c ₩ lb; Manufactures of, not enumerated, 35 per cent. ad val. Bars, Block and Pigs free. Banca, subject to duty of 10 per cent.

Banca	₩ lb 26 @ 26c
Straits	₩ lb 23 @ 24c
English	23 @ 24c

TIN PLATES.

I C 10X14 } 14X20 }	Prime Charcoal	$6.25 @ 6.50
I C 12X12	"	6.50 @ 6.75
I X 10X14 } 14X20 }	Charcoal	$8.00 @ 8.25
I X 12X12	" "	8.50
D C 12½X17		6.75
D X 12½X17		7.75
For each additional X add		1.00

COKE TIN PLATE.

	Best.	Ordinary
I C 10X14 } I C 14X20 }	$6.00	5.25 @ 5.75
I C 12X12	6.25	5.50 @ 5.75

TERNE PLATE

	Prime Char.	2d qual.	Coke.
I C 14X20	$6.50 @ 6.75	5.25 @ 5.37½	5.00 @ 5.25
I X 14X20	7.25		
I C 20X28	11.50	11.00	10.50 @ 11.00
I X 20X28	14.00		
I C 20X200	17.00		
I C 14X20 M. F. Brand			7.75

SOLDER—½ & ½	15 c
Extra	13½c
No. 1	12½c
SPELTER—DUTY: in Pigs, Bars and Plates, $1.50 ₩ 100 lbs.	
American, cash	6c
Foreign	5 @ 6¼c
ZINC.—DUTY: Pig or Block, 1.40 ₩ 100 lbs. Sheet 2½c ₩ lb.	
Sheet, Cask	7½ @ 8c
" Open	8½ @ 9c

Paper Stock, &c.

(Dealers' Selling Prices).

White Shirt Cuttings, No. 1		6¾ @ 7
" " No. 2		5 @ 5¼
Mill Assorted Whites		5½ @ 5¾
Unbleached Muslins		6¾ @ 6¾
City Whites, No. 1		4½ @ 5
New Canton Flannels		6 @ 6¼
New Seconds, light		3¾ @ 4
" dark		2¾ @ 3¼
No. 2 Whites		2½ @ 3
Cotton Canvas		4¼ @ 4½
Linen Canvas, No. 1		4 @ 4¼
Seconds, City No. 1		1¼ @ 1½
" No. 2		1 @ 1¼
Colors, per 100 lbs		75 @ 80
Manila Rope		3¼ @ 3½
" Tarred		3½ @ 3¾
Gunny Bagging, No. 1		3½ @ 3¾
" No. 2		1½ @ 2
Kentucky Bagging		4¼ @ 4½
Burlap Bagging, No. 1		3¾ @ 4
Tar Shakings		2¼ @ 2½
Hemp Twine Stock		4½ @ 4¾
Hard White Shavings, No. 1		4¼ @ 4½
Soft White Shavings, No. 1		3¾ @ 4
White Shavings, No. 2, soft		3¼ @ 3½
Mixed Shavings, part white		3¼ @ 3¼
Ledger and Writing		3¼ @ 3½
Solid Stock		3¼ @ 3½
Book Stock No. 1, light		1¼ @ 1¾
Old Newspapers		1 @ 1¼
Pure Manilas		2¾ @ 2¾
Bogus Manilas and Hardwares		1¼ @ 1¼
Commons		85 @ 90
Binders' Board Cuttings		1¼ @ 1¾
Straw Board Cuttings		1 @ 1¼

Paints, Oils, &c.

Paints.

Black Lamp, Coach Painters	₩ lb	20c
" " Ordinary		16c
" Ivory Drop, fair		12 @ 14c
" " best		23c
Black Paint, in oil	kegs 8c	asst'd cans, 11c
Blue Prussian, fair to best		40 @ 45c
" " " in oil		45 @ 55c
Blue Chinese dry		70c
" Ultramarine		18 @ 20c
Brown, Spanish		14c
" Van Dyke		10c @ 12c
Green, Chrome		15 @ 20c
" " in oil		14 @ 18 @ 20c
" Paris	good 24c; best, 30c	
" " in oil	" 30c;	45c
Iron Paint, Bright Red	₩ lb	2½c
" Brown	₩ lb	1½c
" Purple	₩ lb	3c
" Ground in Oil, Bright Red	₩ lb	4½c
" " " Red	₩ lb	5c
" " " Brown	₩ lb	1½c
" " " Purple	₩ lb	5c
Mineral Paints		2 @ 4c
Orange Mineral		10c
Red Lead, American		7½c
" Venetian (Eng.) dry		$1.65 @ $1.70
" in oil	asst'd cans, 11c; kegs, 8c	
" Indian dry		9 @ 12c
Rose Pink		10 @ 13c
Sienna, American, Raw		4c
" Burnt		4½c
" " in oil		12 @ 15 @ 20c
" Raw		11 @ 15 @ 25c
Umber, Burnt		4 @ 8c
" " in oil		9 @ 12 @ 16c
" Raw		3½ @ 7½c
" " in oil		10 @ 16 @ 18c
Vermillion, Chinese		90c
" English		55 @ 57½c
" Trieste		1.10c
" American, Common		15c
White Lead, American, pure dry		7½c
" " " in oil		7½ @ 8c
White, Paris, English, prime	in bbls. 2 @ 2½c	
Yellow Ochre, French		$1.75
" " in oil	asst'd cans, 11c; kegs, 8c	
" " Vermont	in casks, 1½c	
Yellow Chrome		17 @ 27c
" " in oil		14 @ 15 @ 25c
Zinc White American No. 1, dry		6½ @ 6½c
" " No. 1, in oil		7c
" French (Paris) dry		8 @ 10c
" " in oil		10 @ 11c

Oils.

Linseed, Raw in casks and bbls	gal. 56 @ 57c
" Boiled " "	" 59 @ 60c
Bleached Whale	₩ gal. 68c
" Sperm	₩ gal. $1.15
" Elephant	70c
Signal	74c
Prime Lard	95c
No. 1 Extra	80c
West Virginia	16 @ 20c
Drilling	40c
Miners' Oil	40 @ 45c
Fish Oil, pressed	40 @ 45c
Neatsfoot	85c
Tallow	65 @ 72c
Machinery	40c
Engine	60c

Sundries.

Mineral Wool	per lb 10c
" extra	" 20c
Asphaltum Cuban	50 @ 80c
" Egyptian	85 @ 90c
Benzine	₩ gal 10½ @ 12c
Chalk	8c
" Block	8c
Dryer, Patent, Am'n	asst'd cans, 9c; kegs, 7c
Frostings	40c
Glue, White	24 @ 35c
" Sheet	20c
Glaziers' Points, Zinc	8c
Gum, Copal	36c
" Damar	24c
" Shellac, English	44c
" " dark	40c
Litharge, English	7½c
Pumic Stone, selected Lumps	4 @ 6c
" powdered	2½c
Pine Tar, bbls	$2.45
Pitch	$2.45
Putty, in bladders	3 c
" in bulk	2½c
Rosin—Common and Good—Strained	$2.25
E & F	$2.65 @ 2.65
G & H	$2.70 @ 2.85
I & K	$3.10 @ 3.30
M & N	$3.80 @ 4.10
Spirits Turpentine	55 @ 56c
Whiting Spanish	1½c
Waste, No. 1 Cop	10c
" No. 1 White Machine	10c
" No. 2 "	9½c
" No. 1 Colored	9c
" No. 2 "	8½c
" Washed Machine	9c

Glass.

FRENCH WINDOW GLASS.

Prices current per box of 50 feet.

Single Thick.—Discount 40 & 5%.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$ 6.40	$ 5.75	$ 5.50	$ 5.25
11 x 14 to 16 x 24	7.25	6.75	6.25	6.00
18 x 22 to 20 x 30	9.25	8.50	7.75	7.25
15 x 36 to 24 x 30	10.25	9.25	8.25	
26 x 28 to 24 x 36	11.00	10.00	9.00	
26 x 36 to 26 x 44	11.75	10.75	9.50	
26 x 46 to 30 x 50	15.25	12.50	10.50	
30 x 42 to 30 x 54	14.00	13.00	11.25	
30 x 56 to 34 x 56	15.00	13.75	12.50	
34 x 58 to 34 x 60	16.50	15.00	13.50	
36 x 60 to 40 x 60	17.50	16.50	15.00	

Double Thick.—Discount 40 & 5%.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$ 8.25	$ 7.75	$ 7.50	$ 7.00
11 x 14 to 16 x 24	10.00	9.25	8.75	8.25
18 x 22 to 20 x 30	12.75	11.75	10.75	
15 x 36 to 24 x 30	14.25	13.00	11.75	
26 x 28 to 24 x 36	15.25	13.75	12.50	
26 x 36 to 26 x 44	16.25	14.75	13.50	
26 x 46 to 30 x 50	17.50	16.75	14.25	
30 x 42 to 30 x 54	18.50	17.25	14.75	
30 x 56 to 34 x 56	19.50	18.25	16.25	
34 x 58 to 34 x 60	20.50	19.50	18.00	
36 x 60 to 40 x 60	23.00	21.00	20.00	

An additional 10 per cent. will be charged for all Glass more than 40 inches wide. Any size over 42 inches in length, and not making more than 81 united inches will be charged in the 84 united inches b cket

EDWARD MILLER & CO.,

MERIDEN, CONN., Manufacturers of

Sheet Brass, Cast Brass, Brass Kettles, Machine Oilers, Lanterns,

KEROSENE LAMPS AND TRIMMINGS, TINMEN'S TRIMMINGS, &c.

Warehouse, - - 35 Warren Street, - - NEW YORK.

AKRON IRON COMPANY,

AKRON, OHIO,

Sole Manufacturers of

Patent Hot Polished Shafting.

Medal of Superiority awarded at American Institute Fair of 1880.

This Shafting is superior to any in the market, and commends itself to the trade for the following reasons, viz:

1st. It is perfectly straight and round.
2d. It can be finished accurately to any desired gauge.
3d. It will not rust or tarnish easily.
4th. It will not warp or spring in key seating.
5th. Its surface is composed of magnetic oxide of iron, and consequently presents a journal or bearing surface that is unexcelled.
6th. The peculiarity of its manufacture is such as to entail loss in making it, if other than superior stock is used. Those purchasing it may therefore be assured of receiving first-class material.

Price lists, catalogues and references furnished on application.

Where parties desire it we cut keyways or splines any ength required, at a moderate charge.

AKRON IRON CO., Akron, Ohio.

AGENTS:

E. P. BULLARD, 14 Dey Street, N. Y.
S. E. BLISS, 89 Lake Street, Chicago, Ill.
D. N. BROWN MACHINERY CO., St. Louis, Mo.
J. H. KERRICK & CO., Indianapolis, Ind.
JOSHUA HENDY, San Francisco, Cal.

TRENTON LOCK & HARDWARE CO.,

TRENTON, N. J.

MANUFACTURERS OF

DOOR LOCKS AND HARDWARE,

BRONZED IRON AND BRONZE METAL DOOR TRIMMINGS, BUTTS AND HARDWARE.

CAST BUTTS,
DOOR BOLTS,
WELL WHEELS,
FLUSH BOLTS,
SHUTTER BOLTS,
PAD LOCKS,
BARN DOOR HANGERS, & RAIL,
GRINDSTONE FIXTURES,
SCREW & SIDE PULLEYS,
NOISELESS PULLEYS,
HAY FORK PULLEYS,
SHELF BRACKETS,

PHILADELPHIA SLIDING DOOR HANGERS AND RAIL.

Having largely increased our facilities and line of goods, we invite the attention of the Trade.

Illustated Catalogues Furnished on Application.

Agencies. { James M. Vance & Co., No. 211 Market St., Philadelphia.
James Marshall, No. 48 Warren St., New York.

THE STANLEY WORKS,

MANUFACTURERS OF

Wrought Iron Butts, Hinges

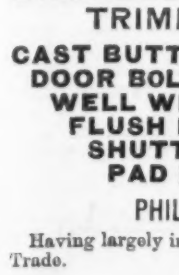
AND

DOOR BOLTS,

Plain, Japanned, Bronzed and Plated.

FACTORIES: New Britain, Connecticut.

WAREHOUSE: 79 Chambers St., New York.



Wilson Bohannan,

Manufacturer of Patent

BRASS PAD LOCKS

For Railroad Switches, Freight Cars, and the Hardware Trade. All sizes, with Brass and Steel Keys, with and without chains.

Patent Horizontal Rim Cylinder Night Latch.

Self-adjusting to doors of any thickness, with Patent Stop and Drawer Back Knob. RIGHT OR LEFT HAND.

PASSENGER CAR LOCKS, Bronzed, Nickel-Plated and Japanned.

☞ Catalogues and Samples sent on application. BROOKLYN, N. Y

Bemis & Call Hardware & Tool Co.

This Wrench can be furnished with Briggs' Pat. Nut or Sleeve.

PATENT COMBINATION WRENCH.

These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite Combinations of a regular Nut Wrench, thus making a combination which has no equal.

For Circulars and Price List, address

BEMIS & CALL HARDWARE & TOOL CO., Springfield, Mass.

GUN POWDER.

Laflin & Rand Powder Co.

No. 29 Murray Street, New York,

Manufacture and sell the following celebrated brands of Sporting Powder known everywhere as

ORANGE LIGHTNING,
ORANGE DUCKING,
ORANGE RIFLE

more popular than any Powder now in use.

Blasting Powder and Electrical Blasting Apparatus.

Military Powder on hand and made to order.

SAFETY FUSE, FRICTIONAL & PLATINUM FUSES.

Pamphlets showing sizes of grain sent free.

Mineral Wool.

A fibrous material, encasing about 90 per cent. of its volume of air, and therefore a superior

NON-CONDUCTOR

OF

HEAT AND SOUND.

Being made from the slag of blast furnaces, it is fire-proof and durable in contact with heated surfaces. Readily applied.

Heaviest grade about 25 lbs. per cubic foot. Price, 1 cent per lb. at works.

U. S. MINERAL WOOL CO.,

16 Cortlandt St., New York.

KEYSTONE RIVETING FORGE.

An Improved Pattern.

Cheap and Durable.

BEST IN THE MARKET.

Send for catalogue to

KEYSTONE PORTABLE FORGE CO.,

204 North 4th St., Philadelphia, Pa.

John Waldron,

Manufacturer of Sprout's Double and Single Shear

Horse Hay Forks

And

Sprout's

HAY ELEVATORS, PULLEYS and GRAPPLES.

Send for Circulars.

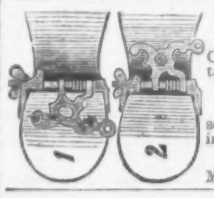
Muncy, Lycoming Co., Pa.

WM. ESTERBROOK,

Wholesale Manufacturer of

Coal Hods,

311 Cherry St., PHILADELPHIA.



THE SAFETY

Combines every advantage possible in an

ICE CREEPER.

Attaches with a thumb screw; turns over into instep; one size for all.

R. P. SCOTT & CO.,

Manufrs., NEWARK, N.J.

FOR SALE,

At New England Machinery Depot,

308 North Third St., Philadelphia, Pa.

Horizontal, Vertical and Locomotive Tubular Boiler, from 3 to 60 H. P., in stock and larger to order. Engines all sizes. Pumps, Heaters, Injectors, steam and hand Brick and Mortar Hoists. Boiler Test Pumps. The new Gravity Coffee Roaster. All of the above constantly kept in stock.

Send for circular and price list.

STOVE REPAIRS.

Repairs for Stoves made at Troy, Albany, Rochester, Cleveland, Buffalo, Boston, St. Louis, Quincy, Chicago, Milwaukee and elsewhere, at

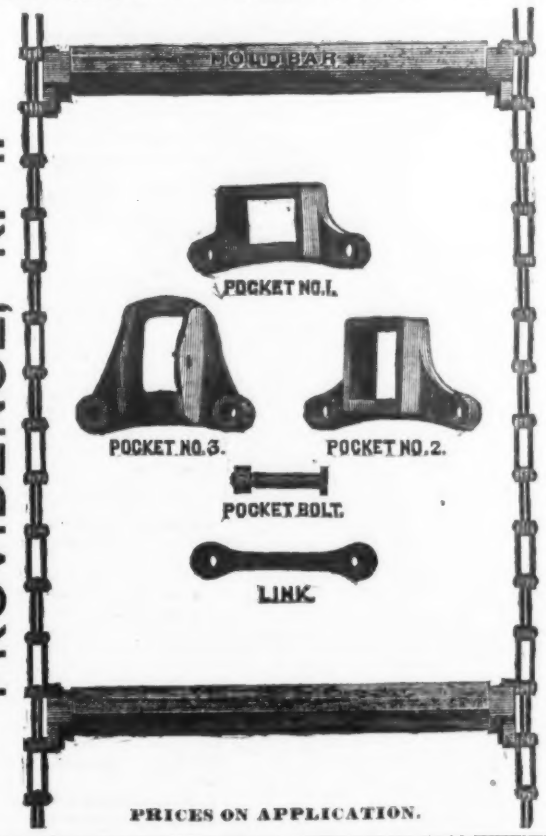
W. C. METZNER,

197 W. Randolph St., Chicago, Ill.

ICE ELEVATOR CHAIN & BLOCKS.

PROVIDENCE TOOL CO.,

PROVIDENCE, R. I.



PRICES ON APPLICATION.

HENRY B. NEWHALL, 105 Chambers St., NEW YORK AGENT.
J. H. WORK, 13 Pearl St., BOSTON AGENT.
S. H. & E. Y. MUORE, 163 & 165 Lake St., CHICAGO AGENT.

THE GENUINE STEBBINS

MOLASSES & OIL GATES,

MANUFACTURED ONLY BY

E. STEBBINS MFG. CO.

BRASS FOUNDERS AND FINISHERS.

Sole Manufacturers

Stebbins and Brightwood

COMPRESSION

AND

GROUND KEY WORK.

Send for circular and price list.

H. M. BREWSTER, Agent.

Brightwood P. O., Mass.

Office of NELSON LYON,

SOLE MANUFACTURER OF

Lyon's Patent Metallic Heel Stiffeners,

Also, Manufacturer of

BRUSHES

Of Every Description,

Nos. 17 & 19 Green St.,

Albany, N. Y., Dec. 8, 1880.

To All Whom it May Concern:

To-day a decree in my suit against G. T. Fisher & Co., of Detroit, for an infringement of my patent, was made and entered, of which the following is an extract:

At a session of the Circuit Court of the United States for the Eastern District of Michigan, held at Detroit &c., on Wednesday, the 8th day of December, 1880. Present, Hon. H. B. Brown, District Judge.

NELSON LYON *against* GUYON T. FISHER, *et al.*

It is ordered, adjudged and decreed, that the act entitled "An act for the relief of Nelson Lyon and Jeremiah S. James," passed by Congress and approved April 1, 1880, &c., is a good, valid and constitutional act.

That the original patent, bearing date July 9, 1872, and numbered 128,843, granted and issued to Joseph Barsaloux, Jeremiah S. James and Nelson Lyon, when corrected by the Acting Commissioner of Patents, as directed by said act, was a good and valid patent.

That the said Joseph Barsaloux was the original and first inventor of the improvements in metallic stiffeners for boot and shoe heels mentioned and described in said letters patent.

That the Reissued Letters Patent No. 9198 dated May 11, 1880, granted to said Nelson Lyon for an improvement in metallic heel stiffeners for boots and shoes, originally patented as aforesaid, is a good and valid patent; that said Lyon is exclusively possessed of said Letters Patent and the invention thereby secured.

That the defendants, G. T. Fisher & Co., and each of them, have infringed upon the said patents and upon the exclusive rights of said Lyon under the same.

That said Lyon receive of said defendants all the profits, &c., they have made, and in addition thereto all the damage he has suffered by reason of the infringements by the defendants, and also the costs, charges and disbursements in the action.

It is also further ordered, adjudged and decreed, that a perpetual injunction be issued against said defendants, according to the prayer of the said complainant's bill.

You are also hereby notified that the perpetual injunction has been issued and served on the defendants

All questions as to damages and settlements in relation to infringements under my patents must be addressed to and made with my attorney, WILLIAM H. KING in my care at the above address.

NELSON LYON.

SABIN MFG. CO.,

MONTPELIER, VT., MANUFACTURERS OF

DOUBLE-ACTING SPRING BUTTS,

SABIN'S LEVER DOOR SPRINGS, For heavy doors.

BOSS AND CROWN SPRINGS, For light doors.

Send for Catalogue. Represented in New York by *DAVID HYMES & CO., 99 Church St.*

RIVETS

C. F. HARRISON,

BOILER, BRIDGE & TANK

CUYAHOGA FALLS, OHIO.

RIVETS

New York Wholesale Prices, November 22, 1881.

HARDWARE.

Anvils.
Eagle Anvils American ... ₩ ℔ 10c dis 20 %
Wright's ... 10¾c @ 11¼c
Armitage's Mouse Hole ... 9½ @ 9¾c
Trenton ... 10¾c
Wilkinson's ... 11c

Anvil, Vise and Drill.
Millers Falls Co., $28.00 ... dis 20 %

Augers and Bits.
Conn. Valley Mfg. Co. / Douglass Mfg. Co. / C. E. Jennings & Co. / Humphreysville Mfg. Co. / Ives / Fletcher (French, Swift & Co) / Griswold / Nobles Mfg. Co. } dis 40 % from list of Jan 7. 1880
Watrous & Co., Extension Lip ... dis 35 %
Cook's, Douglass Mfg. Co ... dis 40&10 %
Snell Mfg. Co.'s C. S. Augers ... dis 40 %
" " B. Machine ... dis 40 %
" " C. S Bits ... dis 40 %
" " Jenning's Bits ... dis 40 %
Patent Solid Head ... dis 40 %
Lewis' Patent Single Twist ... dis 40 %
Russell Jennings' Auger, Dowel, Machine-Dowel and Hand-Rail Bits ... dis 10&10&10 %
Russell Jennings' Augers ... dis 16⅔&10&10&10 %
Russell Jennings' Car and Machine Bits, Boring-Machine and Millwrights' Augers dis 5&10&10&10 %
Imitation Jenning's Bits ... dis 40@45 %
Ives' "Jennings" Bits ... dis 33⅓&10 %
Andrews Bits ... dis 40 %
Expansive Bits, Clark's, small, $18; l'ge, $26 ... dis 25 %
" " Ives ... $20 @ $30—dis 33⅓ %
" " Blake's ... $20—dis 40 %
" " Parmelee's ... $20 and $30 dis 33⅓ %
Hollow Augers Ives' / French, Swift & Co } dis 15&10 %
" " Douglas ... dis 15&10 %
" " Bonney's Adjust ... ₩ doz $48—dis 25&10 %
Stearns' Adjust., ₩ doz $48—dis 20&10 %
Ives' Expansive, each $4.50—dis 30&10 %
Universal Expansive, ea $4.50—dis 20 %
Woods ... dis 25 %
Gimlet Bits ... $7.50 ₩ gross, dis 45 %
" Diamond ... ₩ doz $1.10 dis 20&10 %
" "Bee" ... dis 35&5 %
Double Cut Gimlet Bits, Shepardson's ... dis 40 %
" " Ct. Valley Mfg. Co ... dis 30&10 %
" " Hartwell's ... dis 60&10 %
" " Douglass' ... dis 40 %
" " Ives' ... dis 50 %
Morse's Bit Stock Drill ... dis 25 %
L'Hommedieu's Ship Augers ... dis 15 %
Watrous Ship Augers ... dis 15 %

Awl Hafts.
Sewing, Brass Ferrule ... $3.50 ₩ gross—dis 40&10 %
" " ... 3.50 " dis 40&10 %
Patent Sewing, Short ... $1.00 ₩ doz—dis 40&10 %
" " Long ... $1.40 ₩ doz—dis 10 %
Patent Peg Plain Top ... $10.00 ₩ gross—dis 40&10 %
" " Leather Top ... 12.00 dis 40&10 %

Awls, Brad Sets, &c.
Awls, Sewing, Common ... ₩ gross $1.70—dis 25&10 %
Shouldered Peg ... ₩ gross 2.45—dis 25&10 %
Patent Peg ... ₩ gross .63—dis 25&10 %
Shouldered Brad ... ₩ gross $2.70—dis 25&10 %
Handled Brad ... $7.00 ₩ gross—dis 25&10 %
Handled Scratch ... $7.00 ₩ gross—dis 25&10 %
" Socket Scratch ... $1.00@$1.25 ₩ doz—net
Brad Sets, Aiken's ... ₩ doz $17.00—dis 45&10 %
" No. 42, $10.50; No. 43, $12.50 ... dis 70&10 %
" Stanley's Excelsior, No. 1, $9.50 ... dis 30&10 %
" " " No. 2, 4.80 ... dis 30&10 %
" " " No. 3, 7.80 ... dis 30&10 %

Axes.
Single Bit 4½ to 5½ and under ... ₩ doz $10.00 net
4½ to 6 and over ... ₩ doz $10.50 net
Beveled ... 50 c ₩ doz advance
Double Bit, 4½ to 5½ and under ... ₩ doz $19.00 net
4½ to 6 and over ... ₩ doz $20.00 net
" Beveled ... $1.00 ₩ doz advance

Axle Grease.—Fraser's ... ₩ ℔ 6c
Axles—Standard list ... dis 45 %

Bag Holders.
Sprengle's Patent, per doz. $18 ... dis 40 %

Balances.
All Spring Balance ... dis 15&10 %

Bells.
Hand, Light Brass ... dis. 65&10 %
" Extra Heavy ... dis 45 %
" White Metal ... dis 60 %
" Silver Chime ... dis 20&10 %
" Globe (Cone's Patent) ... dis 25&10 %
Gong, Abbe's ... dis 20&10 %
" Yankee ... dis 30&10 %
" Barton's ... dis 30&10 %
Crank Taylor's ... dis 20&10 %
" Brook's ... dis 50&10&2 %
" Cone's ... dis 10 %
" Connel's ... dis 35 %
Lever, Sargent's ... dis 55&10 %
" Taylor's Bronze or Plated Lever ... net
" " Japanned Lever ... dis 25&10 %
" R. & E. M. Co.'s ... dis 45&10 %
Pull, Brook's ... dis 50&10&2 %
" Western ... dis 25&10 %
Call ... dis 25 %
Cow, Common Wrought ... dis 55 & 10 %
" Western ... dis 20&10 %
" Sargent's new list ... dis 55&10 %
Kentucky "Star" ... dis 20&10 %
" Sargent's new list ... dis 55&10 %
Dodge's Genuine Kentucky, new list—
oz. c 1 1½ 2 3 4 5 6 Hog } dis 50 %
$12.00 10.00 9.00 8.00 6.00 5.00 3.50 2.50 5.00
Texas "Star" ... dis 4 %

Bellows.
Blacksmiths', Common ... dis 45 %
Extra and Pittsburgh Pattern ... dis 20 %
Moulders ... dis 25 %
Hand Bellows ... dis 25 %

Belting, Rubber.
Y Belting and Packing Co ... dis. 20@50 %

Bit Holders.
Extension, Barber's ... ₩ doz $15.00—dis 40&5 %
" Ives' ... ₩ doz $15.00—dis 40 %
Diagonal ... ₩ doz $24.00—dis 40 %
Angular ... ₩ doz $24.00—dis 40&5 %

Blind Adjusters.—Domestic ... ₩ doz $2.00, dis 15 %
Excelsior ... ₩ doz $10.00.—dis 50&10&2 %

Blind Fasteners.
Mackrell's ... per doz. pairs, $1.00, dis 10%
Van Sand's ... Screw pattern, per gro., $10.00 ... dis 35 %
" old pattern ... ₩ gross, $8.50 net
Washburn's Patent ... ₩ gross $10.50 net
Merriman's ... new list net
Mackrell's ... ₩ doz. pairs, $0.65, dis. 10 %

Blind Staples.
Barbed, ⅝ in. and larger ... ₩ ℔ 11c net
⅜ in ... ₩ ℔ 13c net

Blocks.
Differential Pulley Blocks ... dis 20 %
Penfield Block Co., Rope and Iron Strap'd ... dis 40 %
" " " Wrot. Iron Com. bushed dis 25 %
" " " " " all steel roll'r dis 10 %
" " " Sheaves " " dis 35 %
Stanley R. & L. Co., Rope and Iron Strap'd ... dis 40&10 %

Bolts.
Cast Iron Barrel, Shutter, &c ... dis. 50&10 %
Cast Iron Chain (Sargent's list) ... dis 60&10 %
Ives' Pat. Door Bolts ... dis 50 %
Wrought Barrel ... dis 60&10 %
" Square ... dis 60&10 %
" Shutter, all Iron, Stanley's list dis 50&10&10 %
" " Brass Knob, " " dis 20&10 %
" " Sargent's list ... dis 60&10 %
" Sunk Flush, Sargent's ... dis 70&10 %
" " Stanley's ... dis 50&10&7½ %
" B. K. Flush, Com'n. Stanley's ... dis 65 %
" " Ex. Heavy ... dis 40&10&10 %
" Plated Knob & Slide Flush " dis 50&10&10 %
Carriage and Tire, Common ... dis 80 %
" Philadelphia, new list ... dis 65&5 %
" Philada. Pattern ... dis 70&5 %
" Shelton's ... (old list) dis 60&10 %
Union Carriage ... dis 70 %
R. B. & W. Carriage (old list) ... dis 65 %
Tire, Am. Screw Co.'s, Phila, new list, Nov 1, '79, dis 75 %
" "Bay State" ... dis 80&10 %
" R. B. & W., new list ... dis 70&10 %
Stove—American Screw Co.'s ... dis 40 %
R. B. & W ... dis 40 %
R. & E. Mfg. Co ... dis 40 %
Plow ... dis 50 %
" R. B. & W ... dis 40 %
Machine ... dis 60 %
Bolt Ends ... dis 60 %
Borax ... 15c ₩ ℔ net

Boring Machines. Upright. Angular.
First quality, no Augers ... $6.50 $6.75 ... dis 40 %
Phillips' with Augers ... 7.00 7.50 net
Jennings & Co., no Augers. 5.50 6.75 dis 40 %

Boxes.
Interchangeable Shelf Boxes ... dis 20 %

Braces.
G. S. Backus ... dis 50 %
Wilson Mfg. Co ... dis 10 %
Barber's ... dis 40&5 %
Spofford's Patent ... dis 50&5 %
Ives Patent Braces ... dis 50&10 %
Common Ball (American) ... dis 50&5 %
Amidon's ... dis 50 %
Barker's Impd ... dis 40 %
Empire ... dis 30 %
Buffalo Ball ... dis 40 %

Brackets.—Shelf (Sargent's) plain ... dis 55&10 %
" " fancy ... dis 60&10 %
Reading ... dis 60&10 %
Bright Wire Goods list of Dec. 15, '79. dis 55&10 %
Bull Rings.—Union Nut Co ... dis 50&20
Sargent's ... dis 66⅔&10 %
Hotchkiss' ... low list dis 15 %
Humason, Beckley & Co.'s ... dis 60&5 %

Butts
Wrought Brass ... dis 75&5 %
Cast Brass, Tiebout's ... dis 30 %
" Corbin's ... dis 20&10 %
Fast Joint, Narrow ... dis 40&10 %
" Broad ... dis 40&10 %
Loose Joint ... dis 50&10 %
" Japanned ... dis 60&10 %
" with Acorn ... dis 50&10 %
" Japanned, with acorns ... dis 50&10 %
Parliament Butts ... dis 55&10 %
Mayer's Hinges ... dis 50&10 %
Loose Pin, no Acorn ... dis 50&10 %
" Acorns ... dis 50&10 %
" " Japanned ... dis 55&10 %
" " Plated Tips ... dis 55&10 %

WROUGHT IRON.
Fast Joint Narrow ... dis 45&10 %
" Lt. Narrow ... dis 45&10 %
" Broad ... dis 45&10 %
Loose Joint, Broad ... dis 60&10 %
Table Butts, Back Flaps, &c ... dis 45&10 %
Inside Blind, Regular ... dis 45&10 %
" Light ... dis 45&10 %
Loose Pin, Wrt ... dis 60&10 %
" " Light ... dis 45&10 %
Spring Hinges:
American Spiral Spring Butt Co., Jap'd ... dis 25 %
" " " Fancy ... dis 20 %
Gem Spiral Spring Butts, Japanned ... dis 25 %
" " Ornamental ... dis 20 %
Geer's Spring and Blank Butts ... dis 25 %
Sabin Mfg. Co.'s Double Acting ... dis 35 %
Union Spiral Spring, Japanned ... dis 25 %
" " Ornamental ... dis 20 %
Union Spring Hinge Co.'s ... dis 25 %
American Spring Hinge Co.'s ... dis 25 %
Union Mfg. Co ... dis 25 %
Bommer's ... dis 25 %
Buckman's ... dis 25 %
Blind Butts, Parker ... dis 70 %
" Palmer ... dis 45&10 %
" Seymour ... dis 70 %
" Shepard's "Double Locking" Nos. 1 & 2 ... dis 70 %
Shepard's "Noiseless," Nos. 50 & 60 ... dis ... 70 %
" Lull & Porter ... dis 66⅔&10 %
" Nicholson ... dis 45&10 %
" Huffer ... dis 50 %
" Clark's, Nos. 1, 3, 5, 40, 45 and 50 ... dis 70 %
" Sargent's No. 1, 3 ... dis 66⅔&2&17 %
" " No. 12 ... dis 70&10 %
" Reading's Gravity ... dis 66⅔&10 %
Clark's Improved Scutter Hinge ... dis 70 %

Bow Pins.
Hotchkiss' ... dis 25 %
Humason, Beckley & Co.'s ... dis 60 %
Sargent & Co's ... $19.70 and $21.40, dis 60&10&10 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co ... dis 20
Bradley's ... dis 25
Beatty's ... dis 25&5 %

1	2	3	4	5	6	7	8
$16.50	16.00	21.50	24.00	27.00	30.00	33.50	36.50

Can Openers.
Messenger's Comet ... ₩ doz $1.00, dis 25 %
American ... ₩ gross $7.50, dis 10 %
Duplex ... ₩ doz 25c, dis 15@20 %
Lyman's ... ₩ doz $3.75, dis 20 %
No. 4, French ... ₩ doz $2.25, dis 55 %
No. 5, Iron Handle ... ₩ gross $7.50 dis 10 %
Eureka ... ₩ doz $2.50, dis 10 %
Sardine Scissors ... ₩ doz $7.00, dis 55 %
Star ... ₩ doz $5.00, dis 20&25 %
Sprague ... dis 75&10 %
"Worlds Best" per gross, No. 1, $12; No. 2, $24; No. 3, $36 ... dis 50 %

Caps—Percussion, ₩ 1000.
U. M. C., F. C. trimmed ... 50c } dis
" F. L. ground ... 70c } 10&10
U. M. C. Cen. fire ground ... 70c } dis
" Double W. proof ... $1.40 } 10&5 %
G. D. & S. B ... 34c, dis 5 %
Double Waterproof, in 1 10's ... $1.40 } dis
Colt's Pistol, " ... 70c } 10 %
F. L ... 50c } dis 10%
E. B. 1-10, Trimmed ... 65c }
E. B. 1-10 Ground Edge ... 70c } 5 %
Musket, in 1-10's ... 80c dis 10&10 %
Cartridges.—Rim ... dis 70&10 %
Central Fire ... dis 20&10 %
Cards.—Horse and Curry..new list, July, '81, dis 10 %
Cotton ... dis 10 %
Wool ... dis 10 %

Carpet Stretchers.
Cast Steel, Polished ... ₩ doz $5.00, dis 30 %
" Iron Steel Points ... ₩ doz $2.00, dis 45 %
Bullard's ... dis 25 %

Casters.
Bed ... dis 40&5 %
Plate and Shallow Socket ... dis 40&5 %
Deep Socket ... dis 25&10 %

Cattle Leaders.
Humason, Beckley & Co.'s ... dis 60&10 %
Sargent's ... dis 66⅔&10 %

Chain.
Trace, 6½-1-2 ... ₩ pair 79c }
" 6½-10-2 ... ₩ pair 70c } dis 40 %
" 7-10-2 ... ₩ pair 86c }
German Halter Chain ... dis 50&10 %
" Coil ... dis 50&10 %
Covert Halter, Hitching and Breast ... dis 35%
Oneida Halter Chain (old list) ... dis 40 %
Galvanized Pump Chain ... ₩ ℔ 9½c net
Jack Chain, Iron ... dis 60&10 %
" Brass ... dis 50&10 %

Chalk.
White ... ₩ gross 60c net
Red ... ₩ gross 80c net
Blue ... ₩ gross 100c net
White Crayons ... ₩ gross 19c net

Chisels.
Socket Framing, Crossman ... dis 65&5 %
" Arlington Edge Tool Co ... dis 65&10 %
" Buck Bros ... new list, dis 22½ %
" Merrill ... dis 65&10 %
" Witherby Tool Co ... dis 65&10 %
" Douglass' ... dis 65&10 %
" Firmers, Crossman ... dis 65&5 %
" Arlington Edge Tool Co ... dis 65&10 %
" Buck Bros ... new list, dis 22½ %
" Merrill ... dis 65&10 %
" Witherby Tool Co ... dis 65&10 %
" Douglass' ... dis 65&10 %
" Corner ... dis 65&10 %
Flanged Firmers extra ... dis 40 %
" Butcher's ... $5.00 @ 5.25 to £
" Spear & Jackson's ... 5.00 to £
" Buck Bros. (Shank) ... 5.25 to £

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron ... dis 25 %
" Adjustable, Gray's ... dis 20 %
" Lambert's ... dis 20 %
" Snow's ... dis 40&5 %
" Hammer's ... dis 15 %
" Stearns' ... dis 20&10 %
Cabinet, Sargent's ... dis 70&10 %
Carriage Makers', Sargent's ... dis 60&10 %
Cord and Tape (T. & S. Mfg. Co.) ... dis 30 %

Clips, Axle.
Norway or Best ... dis 40&5 %
Superior ... dis 65&5 %

Coal Hods.
Griffiths ... dis 33⅓ %
Cockeyes ... dis 35&10 %

Cocks, Brass.
Racking ... new list, July 10, '80 }
Globe ... " " } dis 40 %
Plain Bibbs ... " "
Ale and Beer ... " "

Coffee Mills.
Board and Box ... dis 45 %
Wilson's ... dis 45 %
Selsor's Pat ... $9.50, $10.50, dis 25 %
American (Enterprise Mfg. Co.) ... dis 30 %
French Steel ... dis 25 %
The "Swift" (Lane Bros.) ... dis. 30 %

Combined Dinner Pail and Lantern.
Per doz $15.00 ... dis 30 %

Compasses, Dividers, &c.
Compasses ... dis 55 %
Calipers ... dis 55 %
Dividers ... dis 55 %
Bemis & Call Co.'s Dividers ... dis 60&5 %
" Compasses & Calipers ... dis 50&5 %
" Wing & Inside or Outside dis 50&5 %
" Double ... dis 60 %
" Call's Pat. Inside ... dis 30 %
Excelsior ... dis 50 %
Miller's Patent ... dis 25 %

Coopers' Tools.
Bradley's ... dis 15 @ 20 %
Corkscrews.—Humason & B ... dis 33⅓ %
Clough's Wire ... dis 25 %
Corn Knives and Cutters.—Bradley's..dis 10 %
Wadsworth's ... dis 33⅓ %

Crow Bars.
Cast Steel ... ₩ ℔ 8½c
Iron, Steel Points ... ₩ ℔ 6½c

Curling Irons, &c.
⅜, ⅝, ¾ in., $1.80 2.00, 2.40 ... dis 10 %
Curling Tongs ... ₩ doz $3.65, dis 10 %
Pinching Irons ... ₩ doz 7.50, dis 20 %

Curry Combs.
Fitch's new list ... dis 50 %
Hotchkiss' Novelty ... new list, July, 1880, dis 25 %
" Exclr. Supr. Champion ... dis 25 %
Lawrence "Perfect" ... dis 25&10 %
Rubber ... ₩ doz $10.00, dis 15 %
Curtain Pins.—Silvered Glass ... net
White Enamel ... net

Cutlery
Meriden Cutlery Co. (Table) ... net
Am. Miller Bro.'s Cutlery Co ... dis 25 %
Humason & Beckley, Pocket ... dis 33⅓ %
Naugatuck Cutlery Co ... list net
Aaron Burkinshaw's Pocket ... dis 25 %

Dog Collars.
Embossed Gilt ... dis 20 %
Leather ... dis 40 %
Brass ... dis 40 %
Celluloid ... dis 40 %

Door Springs.
Torrey's Rod ... ₩ doz $2.10, dis 10 %
Gray's " ... ₩ doz $1.70, net
Eee Rod ... ₩ doz $1.70, net
Warner's ... dis 15&10 %
Gem (Coil)—
No. 1, Large, Japanned ... ₩ doz $4.00 } dis
No. 2, Medium, " ... ₩ doz 2.75 } 25&10 %
No. 3, Small. " ... ₩ doz 2.00 }
Star (Coil)—For Cop'd, Nickel-Plated, &c. see list.
No. 4, ("Snoo Fly") Screen door size ₩ doz $1.50 }
No. 5, Screen Door Size ... ₩ doz $2.00 } dis
No. 6, Medium ... ₩ doz 2.75 } 30&10 %
No. 7, Large ... ₩ doz 4.00 }
Sabin's Lever..No. 1, $1; 2, $1.50; 3, $2; 4, $2.50; dis 30 %
Sabin's Boss ... No. 1, $5.40; 2, $4.20; 3, $3.00, dis 50 %
Sabin's Crown ... ₩ doz $2.75, dis 50 %
Philadelphia ... 5 in., $5.00; 8 in., $7.75 dis 35 %
Barker's Concealed ... dis 20 %
Cowell's ... No. 1, $18.00; No. 2, $15.00 ₩ doz, dis 50 %
Rubber, complete ... ₩ doz $1.80, dis 10 %
Hercules ... dis 40 %

Drawing Knives.
Arlington Edge Tool Co ... dis 65&10 %
Crossman's No. 1 ... dis 65&5 %
Merrill ... dis 65&10 %
Nobles Mfg. Co ... dis 15 %
Bradley's ... dis 35 %
Adjustable Handle ... dis 20 %
Witherby Tool Co ... dis 65&10 %
Douglass ... dis 65&10 %

Drills and Drill Stocks.
Blacksmiths' ... each $2.50 dis 10 %
Blacksmiths Self Feeding ... each $7.50, dis 20 %
Breast P. S & W ... dis 20&10 %
" Hotchkiss ... dis 20 %
Breast, Wilson's ... dis 20 %
" Miller's Falls ... each $3.00, dis 25 %
" Bartholomew's ... each, $2.50 dis 25&10 %
Ratchet, Merrill's ... dis 10 %
" Ingersoll's ... dis 25 %
" Whitney's ... dis 20 %
" Weston's ... dis 20 %
" Moore's Triple Action ... dis 20 @ 25 %
Whitney's Hand Drill ... dis 50 %
Wilson's Drill Stocks ... dis 10 %
Automatic Boring Tools ... each $2.25, dis 20 %
Drill Chucks.—Morse's Beach Patent ... dis 30 %
" Adjust..each $10.00, dis 30 %
Danbury ... $8.00, dis 30 %

Egg Beaters.
Dover ... ₩ doz. $2.50 dis 2 %
Acme ... $20 per gross, dis 33⅓&10 %
Standard ... $24 per gross, dis 33⅓ %
National ... ₩ doz $4.50, dis 33⅓ %
Family ... per gross $21; per doz., $2 net

Elevator Buckets.
Mill E. Buckets, light, 3½ to 10 in. (Duc's Improved) ₩ 100 $15.00 @ $54.00, dis. 10 %
Mill E. Buckets, heavy, 5 to 10 inches (Duc's Improved) ₩ doz $5.60 @ $10.20 dis. 10 %
Storehouse, Duc's Pat.) 12 to 17, $12.00 @ $20.00, dis. 10 %

Emery and Emery Paper.
Regular numbers ... ₩ ℔ 6c
Flour and F F ... ₩ ℔ 4c
B. & A. Emery Paper ... dis 25@30 %
Sibley's Emery and Crocus Cloth, Large size, $16; Medium, $10.50 per ream; dis 15 %

Enameled and Tinned Ware.
Kettles ... dis 45 %
Sauce Pans ... dis 30 %
Tinned Sauce Pans ... dis 30 %

Escutcheon Pins.
Brass ... dis 50 %

Escutcheons.
Door Lock ... Same discounts as Door Locks
Brass Thread ... dis 55 %
Wood ... dis 25 %

Faucets.
Fenn's ... dis 40 %
Bohren's Pat. Rubber Ball ... dis 25 %
Fenn's Cork Stops ... dis 33⅓ %
Lane's (Self Measuring) ... ₩ doz., $36.00, dis. 25 %
Star ... dis 55&10 %
Frary's Patent Petroleum ... dis 20&10 %
Wood and Metallic ... dis 40 %
West's Patent Key ... dis 45 %
Metallic Key, Leather Lined ... dis 50 %
Cork Lined ... dis 70 %
Enterprise (Self Measuring) ... ₩ doz, $36.00, dis 30 %
J. Sommer's Best Metallic Key ... dis 40 %
J. Sommer's Cork-lined, 1st quality ... dis 50
Felloe Plates ... ₩ ℔ 10c, dis 20 %

Files.
Auburn ... $5.00 to £, dis 35 %
E. M. Boynton's ... new list, dis 25 %
J. & Riley Carr ... 4.50 to £
J. & Riley Carr, Horse Rasps ... $4.75 to £
Johnson & Bro ... dis 30 %
Butcher's ... 4.50 to £
Walter Spencer & Co.'s "Diamond" ... 4.50 to £
Fisher's ... 4.75 to £
Moss & Gamble ... 4.50 to £
H. Disston & Sons (new list) ... dis 40 %
Heller Bros.' Horse Rasps ... dis 30 %
Nicholson ... dis 40 %
New American ... dis 40 %
Union File Co ... dis 40 %

Fluting Machines.
Knox, 4½-inch Rolls ... $3.50 each } dis 25 %
" 6 " " ... 4.00 " }
Peerless, 4-inch Rolls ... 4.00 each net
" 5 " " ... 4.75 each net
Eagle, 3½-inch Roll ... $2.15, dis 25 %
" 5½ " " ... $2.85, dis 25 %
Eureka, No. 1, 7-inch Roll ... 6.00 each, dis 10 %
" No. 2 5-inch Roll ... 4.00 each, dis 10 %
Crown..4½-in. $3.50; 6-in., $4.00; 8-in. $6.50 each dis 25 %
Star ... 4½ in., $4.00; 6 in., $5.00 each dis 10 %
Crown Jewel ... 6 in., $3.40 each. dis 25 %
American, 5 in., $3; 6 in., $3.40; 7 in., $4.50 each, dis 25 %
Domestic Fluter ... 1.50 each net
Geneva Hand Fluter, White Metal..₩ doz $12, dis 25 %
Crown Hand Fluter, Nos. 1, $15.00; 2, $12.50; 3, $10.00 ₩ doz ... dis 33⅓ %
Shepard Hand Fluter ... No. 85 ₩ doz $10
" " " No. 95, $0.00; No. 110, $7.00;
" " " No. 70, $12.00; No. 65, $8.00 ... net
Clark's Hand Fluter ... ₩ doz $15.00, dis 33⅓ %
Combined Fluter and Sad Iron ... ₩ doz 15.00, dis 30 %
Buffalo ... ₩ doz 10.00, dis 10 %

Fluting Scissors ... dis 45 %

Fly Traps.
Paragon ... per doz, $3; net

Forks.
Hay, Manure and Spading ... dis 50 %
Plated "A 1, Rogers & Bro ... dis 40&5&5 %
" Reed & Barton ... dis 40&5&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co ... dis 30 %
American ... dis 20 %

Fry Pans.
Burnished, list as follows ... dis 60&10 %

No.	0	1	2	3	4	5	6	7	8
₩ doz	$3.00	$3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00

"Acme" ... dis 40&10 %

Gauges.
Marking, Stanley's ... dis 50&10 %
" Chapin's ... dis 55&10 %
Wire ... dis 10&10 %
" Disston's ... dis 20 %

Gimlets.
Nail and Spike ... dis 45 %
"Bee" Gimlets ... ₩ gross $12.00 dis
"Eureka Gimlets ... dis 50 %
"Diamond Gimlets ... dis 40 %
Double Cut, Shepardson's ... dis 40 %
" " Hartwell's ... dis 50 %
" " Ives' ... dis 50 %
" " Douglass' ... dis 40%

Glue Pots.
Tinned and Enameled ... dis 20&10 %
Family, Howe's 'Eureka' ... dis 25 %
" L. F. & C.'s "Handy ... dis 25 %

Grindstone Fixtures.
Sargent's Patent ... dis 70&10&10 %
Reading Hardware Co., new list ... dis 25&10 %

Gun Wads.
U. M. C. B. E. 11 up ... $2.00 }
" " 9 & 10 ... 2.30 }
" " 7 & 8 ... 2.00 } dis 5&5 %
" P. E. 11 up ... 3.10 }
" " 9 & 11 ... 4.00 }
" " 7 & ... 4.90 }

Halters.
Covert's Pat. Rope ... dis 50%
Horse and Cattle Ties, Covert's ... dis 50%

Hammers.
Maydole's ... dis 15 %
Cheney's ... dis 25 %
Hartford Hammer Co. (new list July 1, '81) ... dis 20 %
Humason & Beckley ... dis 50 %
Verree ... dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 and 1.75, dis 25&10 %
Warner & Noble's ... dis 10 %
Kip's ... dis 25 %
Yerkes & Plumb ... dis 15 %
Wilkinson's Smiths' ... 11½c ₩ ℔ net

Hand Cuffs and Leg Irons.
Providence Tool Co. Hand Cuffs, $15.00 ₩ doz } dis 10 %
" " Leg Irons, $25 ₩ doz }
Tower's ... dis 25 %

Handles.—Door or Thumb Latches—

Nos.	0	1	2	3	4	
Per doz	$0.80	1.00	1.18	1.35	1.60	dis 60&10 %

Roggin's Latches ... per doz 25c@40c net
Bronzed Iron Drop Latches ... ₩ doz $0.75 @ 0.85 dis 10 %
Jap'd Store Door Handles—Nuts. $1.62; Plate $1.08 no Plate, $0.87 ... dis 10 %
Barn Door ... per doz $1.40, dis 10 %
Wrought Chest ... dis 65&10 %
Surface Chest ... dis 55&10 %
Flush Chest ... dis 60&10&10 %
Lifting ... dis 55&10 %
Saw and Plane ... dis 40&10 %
Boynton's Pat. Loop Saw Handles ... dis 25 %
" Centennial Saw Handles ... dis 25 %
Hammer and Hatchet ... dis 20 %
Brad Awl ... ₩ gross $2.00, dis 20&10 %
Hickory Firmer Chisel, assorted, ₩ gross $4.50
" " " large, " 5.00
Apple " " assorted, " 5.00
" " " large, " 6.00 } dis
Socket " " assorted, " 3.00 } 20&10
" Framing " assorted, " 5.00 } @
File, assorted, ₩ gross ... 2.75 } 25@10 %
Auger, assorted, ₩ gross ... 6.00
" large ... 7.00
Patent Auger, Ives' ... dis 25
" Douglass' ... ₩ set $1.25, net
" Swan's ... ₩ set $1, net

Hangers.
Barn Door, old patterns ... dis 60&10 %
" New England ... dis 60&10 %
Challenge ... dis 50 %
Climax (Anti-Friction) ... dis 50 %
Sterling Improved (Anti-Friction) ... dis 65&10 %
Cheritree ... dis 50&10 %
Kidder's ... dis 50&10 %
U. S ... 4 in., $12; 5 in., $15; dis 60 %
The "Boss" ... dis. 50&10 %

Harness Snaps.
Henshaw's ... List of 1⅛ changed to 14.00, dis 55 & 10 %
Judd's ... " " 14.00, dis 55 & 10 %
Fitch's (Bristol) " " 14.00, dis 55 @ 10 %
Hotchkiss' ... dis 12 %
Andrews' ... dis 50 %
Sargent's ... dis 65&10 %
"German ... dis 75 %
Covert ... dis 40&10 %
Covered Spring ... dis 45&10 %

Hatchets.
Isaiah Blood ... dis 25 %
Shingling, Nos. 1 2 3 ... ₩ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3 ... ₩ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3 ... ₩ doz 7.50 8.00 8.50
Hunt's ... dis 20&10 %
Shingling, Nos. 1 2 3 ... ₩ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3 ... ₩ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3 ... ₩ doz 7.50 8.25 9.00
Hurd's ... dis 35 @ 40
Shingling, Nos. 2 3 ... ₩ doz $8.00 $8.50 $9.00
Claw, Nos. 1 2 3 ... ₩ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3 ... ₩ doz 8.00 .50 9.00
Yerkes & Plumb ... dis 30
Shingling, Nos. 1 2 3 ... ₩ doz $7.50 $8.00 $8.50
Claw, Nos. 1 2 3 ... ₩ doz 8.25 8.75 9.25
Lathing Nos. ... ₩ doz 7.50 8.00 8.50
Simmon's ... dis 20
Shingling, Nos. 0 1 2 3 ... ₩ doz $7.50 $8.00 $8.50 $9.00
Claw, Nos. 1 2 3 ... ₩ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3 ... ₩ doz 8.00 8.50 9.00
Broad, Nos. 1 2 3 4 ... ₩ doz 9.00 10.00 12.00 14.00
Nos. 5 6 7 8 ... ₩ doz 16.00 18.00 20.00 22.00
Collins ... dis 10 %
Shingling, Nos. 1 2 3 ... ₩ doz $6.00 $6.50 $7.00
Claw Nos. 1 2 3 ... ₩ doz 6.50 7.00 7.50
Lathing, Nos. 1 2 3 ... ₩ doz 6.00 6.50 7.00

Hay Knives.
"Lightning" ... ₩ doz $20.00 net
Wadsworth's ... dis 33⅓

Hinges.
Gate, Western ... ₩ doz $6.25, dis 60&10 %
" N. E ... ₩ doz $10.15, dis 60&10 %
" N. E. Reversible ... ₩ doz $6.50, dis 60&10 %
Gate, Clark's Nos. 1, 2, 3 ... dis 50&10 %
" N. Y. State ... ₩ doz $6.50, dis 60&10 %
" Automatic ... ₩ doz $12.50 dis 40 %
" Common Sense ... dis 20&10 %
" Seymour's ... dis 50&10 %
" Shepard's ... Nos. 10, 20 & 25, dis 60 %
Rolled Blind Hinges ... dis 60&10 %
Rolled Plate ... dis 60&10 %
Rolled Raised ... dis 60&10 %
Plate Hinges / "Providence" { 8, 10 & 12 in. $6.33 ₩ 100 ℔ / over 12 in. $5.00 ₩ 100 ℔ } ... dis 10 %
Screw Hook and Strap { 8, 10, 12 in., $6.60 ₩ 100 ℔ / 14 to 36 in.. $5.25 ₩ 100 ℔ } dis 10 %
Heavy Welded Hook { 8 to 12 in.. $6.60 ₩ 100 ℔ / 14 in. & up, 5.25 ₩ 100 ℔ } dis 10 %
Screw Hook and Eye ... { ⅜ & 1 in., 90 / ⅝ in. 90 / ¾ in. 100 / ½ in. 120 } dis 20 %
Wrought Strap and T. list Dec. 20, '77 ... dis 45&10&10 %

Hoes.—Riveted Shank ... per doz, $5.00; dis 35 %
Socket ... ₩ doz $5.25, dis 35 %
Grub ... dis 15 %
Planters' ... dis 35 %
Scovill Pattern ... dis 20&10 %
Scovill Pattern, Handled ... dis 25 %
Hick's Pat. Solid C. S. Planters' ... dis 20&10 @ 30 %
" " Scovill Pattern dis 20&5 @ 35 %
Winsted & Lane, Planters ... dis 25 %
" Scovill Pattern ... dis 20@25 %
Magic ... per doz, $5; net

Hooks.
Bird Cage, Sargent's list ... dis 60&10 %
" Reading ... dis 35&10 %
Cotton ... per doz. $4, dis 50 %
Cotton, Patented (N. Y. Mallet & Handle Wks) dis 30 %
Cotton (Humason & Beckley Mfg. Co.) ... dis 40 %
Belt ... dis 60&10 %
Bench—Hotchkiss', $5.00 ₩ doz ... dis 10 %
" Weston's, No. 1, $10.00; No. 2, $9.00 ₩ doz dis 25 %
" McGill's, $3.00 ₩ doz ... dis 25 %
Clothes Line Sargent's list ... dis 60&10 %
" Reading list ... dis 45&10 %
Ceiling } Sargent's list ... dis 60&10 %
Harness } Reading list ... dis 40&10 %
Coat and Hat, Sargent's list ... dis 60&10 %
" Reading ... dis 40&10 %
Picture Hooks, Brown's Pat. Solid Brass, $4 per gross ... dis 25 %
Tassel (T. & S. Mfg. Co.) ... dis 40 %
Wrought Staples and Hooks and Staples ... dis 70 %
" Staples, Stanley's list ... dis 65&10 %
Wire Screw Hooks and Eyes ... dis 55&10 %
Grass and Bush ... dis 40@45 %
Whiffletree—Patent ... dis 40&10 %
Hooks and Eyes—Malleable Iron ... dis 65&10 %
" " Brass ... dis 65&10 %

Horse Nails

	Nos. 5	6	7	8	9	10	
Ausable, ₩ ℔	31c	28c	26c	25c	24c	23c	dis 30 %
Clinton, "	...	23c	21c	20c	19c	18c	dis 20 %
Essex, "	31c	28c	26c	25c	24c	23c	dis 30 %
Putnam, "	31c	28c	26c	25c	24c	23c	dis 10&10 %
National, "	35c	33c	31c	20c	19c	18c	dis 20&10 %
Vulcan, "	28c	24c	23c	22c	21c	20c	dis 10 %
Globe, "	28c	25c	23c	22c	21c	20c	dis 10 %
A. C., "	37c	35c	23c	22c	21c	21c	dis 20 %
Ch'mpl'in Forged "	28c	25c	23c	22c	21c	20c	dis 10 %

Horse Shoes.—Burden ... ₩ keg $4.37
R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy ... ₩ keg 4.37½
Mule Shoes ... ₩ keg 5.37½
Dunning's Finished Steel ... $11.0

Ice Awls, Chisels, &c.
American Ice Chisel ... ₩ doz. $3.50 net
National " ... ₩ doz $2.25 dis 20 %
Novelty Ice Breakers ... ₩ doz $6.25 dis 20 %
White's Sliding Head Picks ... ₩ doz $2.50 dis 40 %
Dunlap's Ring Picks ... ₩ doz $3.00, dis 40&10 %
Wood Head Picks, Sargent's ... ₩ doz $1.60, dis 40&10 %
Iron " ... ₩ doz 1.25, dis 40&10 %
Ice Mallets Pick in Head ... ₩ doz 1.75 net
" Pick in Handle ... ₩ doz 3.00 net
Ice Axes, Small, Cast or Malleable ... ₩ doz 1.20 dis 10 %
Kitchen Ice Tongs ... ₩ doz 2.25 net
Combination Ice Tools ... ₩ doz $200 net

Kettles.
Brass, 7 to 13 inches inclusive ... ₩ ℔ 30c net
Brass larger than 13 inches ... ₩ ℔ 35c net
Enameled ... dis 45 %

Knives.
Ames' Butcher Knives ... dis 20 %
" Shoe " ... dis 15 %
" Bread " ... ₩ doz $1.50, dis 15 %
Moran's Shoe and Bread Knives ... dis 20 %
Hay and Straw—Wadsworth's ... dis 33⅓ %
Table and Pocket ... See Cutlery

Knobs.
Carriage (Jap'd 80c. ₩ gross) ... dis 60 &10%
Base—Common ... dis 30&10%
Hemacite Door Knobs ... New list, dis 35&5 %
Door, Mineral / " Por Jap'd / " " Plated / " " Por } Same discounts as Door Locks.
Furniture, Plain ... 75c gross inch, dis 10 %
" Wood Screws ... dis 20 %
Picture (T. & S. Mfg. Co.) ... dis 50&10%
" Sargent's ... dis 60&10 %
Hemacite Picture ... dis 35 %
Shutter, Porcelain ... dis 50&10 %

Ladles.
Melting—Sargent's ... dis 50&10 %
" Reading ... dis 30&10 %
" Monroe's Patent ... ₩ doz $4.00, dis 40 %
" P. S. & W ... dis 30&10 %

Lanterns.
Tubular ... No. 0, $8.65; No. 1, $10.15 With Guards 35c extra. } net
Nail City ... No. 1, per doz., $10; No. 2, $9, net
Meteor ... No. 1, per doz., $9.50; No. 2, $8.50, net
Hurricane No. 2 ... ₩ doz $5.75 net
Peerless ... No. 5. ₩ doz $11.75, dis 10&10 %
Brady's Patent ... dis 10&10 %
Ætna ... dis 10&20 %
Yankee ... dis 10&10 %

De Beque ... dis 10&10 %
Police..Small, $6.25; Med., $7.50; Large, $12.00, dis 10 %
Convex Reflector ... $8.75 ₩ doz, dis 10%

Lawn Mowers.
Pennsylvania, Philadelphia and Excelsior, new list ... dis 30 %

Lemon Squeezers.
Porcelain Lined ... ₩ doz $6.00—dis 30 %
Wood ... ₩ doz $3.00—dis 30 %
Eureka, Tinned ... ₩ doz $8.00—dis 10 %
Dunlap's Improved ... ₩ doz $4.00 net
Sammis' ... No. 1, $7.00; No. 2, $12.00 ₩ doz; dis 45 %
Townsend's Patent ... $6.00 ₩ doz., dis 33⅓ %
Jennings "Star" ... $3.50 per doz net

Lines.—Linen Fish ... dis 25&10 %
Cotton Chalk ... dis 55 %
Sil. Lake Chalk ... Nos. 0, 1, 2, 3, $6.00, $6.50, $7.00, $7.50 ... dis 25 %
Mason's Linen ... dis 25&10 %
Wire Clothes, Galvanized ... each 25 @ 40c net

Locks and Latches.
Cabinet Eagle / " Gaylord / " Bridgeport } Changes made in list price of some numbers Jan. 1, 1881, dis 25&2 %
" P. & F. Corbin ... dis 60 %
" A. E. Deitz ... dis 30@40
Trunk, new list, Jan. 1, 1881 ... dis 15&2 %
Langstroth & Crane's List Jan. 1 '77.
Round Key, No. 1 to 5 ... dis 40&10 %
" No. 5½ to 12 ... dis 40&10 %
Flat Key ... dis 33⅓&10 %
A. E. Deitz, Flat Key ... dis 30@30 %
Yale Lock Co., Flat key ... dis 40 %
"Shepardson" or "U. S." ... dis 35 %
"Felter" or "American" ... dis 33⅓ %
Plate ... dis 33⅓&2 %
F. Many's 'Extension Cylinder" ... $10.50 ₩ doz, net

DOOR LOCKS, &C
Branford / Norwalk / Norwich / P. & F. Corbin / Russell & Erwin / Mallory, Wheeler & Co. / Reading Hardware Co. / Trenton Lock Co. } List of June 10, with changes of Dec. 1, 1880, and April 19, 1881, dis 45&2 %
Padlocks—Russell & Erwin / " Mallory, Wheeler & Co. / " Wm. Wilcox & Co. } dis 40 % and 2 % for cash
" Yale Lock Mfg. Co.'s "Standard" ... dis 40 %
" Romer's ... dis 30 %
" Conestoga ... dis 60 %
" J. H. McWilliams ... dis 10 %
" A. E. Dietz ... dis 35 %
" "Star" ... dis. 35 %

Lustro.—4-oz. bottles, per doz, $2; per gro, $18; net

Mallets.—Hickory ... dis 10&10 %
" Lignumvitæ ... dis 10&10 %
Penfield Block Co., Lig., Apple & Hickory ... dis 30 %

Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 3 4 ₩ doz..$14.00 17.00 19.00 30.00—dis 30 %
Miles' Challenge ... Nos. 1 2 3 ₩ doz..$22.00 30.00 40.00—dis 35 %
Perry's Nos. 1 2 3 4 4 g'rd 5 g'rd Each ... $3.00 4.00 5.00 11.00 13.00 36.00—dis 30
Woodruff's (P. S. & W.) ... Nos. 100 150 ₩ doz $15.00 18.00 dis 30 %
Hales' ... Nos. 11 12 13 ₩ doz..$27.00 33.00 45.00..dis 40&10&2 %
Draw Cut ... Nos 5 2 6 8 10 Each..$50.00 75.00 80.00 225.00 400.00—dis 20 %
American ... dis 25 %
Nos ... 1 2 3 4 B 5
Each ... $5.00 7.00 10.00 25.00 50.00 60.00
Kieser's No. 55 ... $40 per doz., dis 40
" Gem ... $25 per doz., dis 40
Silver & Deming ... dis 25
Pennsylvania ... dis 40&10 %
Nos ... 1 2 3 00
₩ doz ... $24.00 28.00 36.00 18.00
Beef Shavers (Enterprise Mfg. Co) ... dis 30 %

Mincing Knives.
Am., (2d quality) per gross, 1 blade, $7; 2 blades, $12; 3 blades, $18 ... net
Lothrop's ... dis 20&10 %
Smith's, per doz, Single $2.25; Double, $3; dis 33⅓&10 %
Cowles Hdw. Co ... dis 40&10 %

Molasses Gates.
Stebbins Pattern ... dis 80 %
" Genuine ... dis 75&10 %
" Tinned Ends ... dis 40&10 %
Chase's Hard Metal ... dis 60&10 %
Bush's ... dis 20 %
Lincoln's Pattern ... dis 50&10 %
Weed's ... dis 15 %
Boss, No. 1 2 3 4 — $7.00 $8.00 $9.00 $10.00 per doz
" Japanned Finish ... dis 60&10
" Bronze " ... dis 50&10

Nails. See Trade Report
Nuts and Washers.—(In lots less than 100 lb add ½c to list.)
Square Nuts ... 7c off list
Hexagon Nuts ... 7c off list
Washers ... 6½c off list

Nut Crackers
Table (Humason & Beckley Mfg. Co.) ... dis 33⅓ %
Blake's Pattern ... ₩ doz $2.50, dis 10 %
Turner & Seymour Mfg. Co ... dis 50 %

Oakum.
Best ... ₩ ℔ 11c
U. S. Navy ... ₩ ℔ 10c
Navy ... ₩ ℔ 8½c

Oilers.—Zinc and Tin ... dis 60 %
Brass and Copper ... dis 50 %
Malleable (Hammer's) ... ₩ doz $5.00, dis 10 %
Prior's Patent or "Paragon Zinc ... dis 60 %
" Brass ... dis 50 %
Olmstead's, Tin and Zinc ... dis 60 %
" Brass and Copper ... dis 50 %
Broughton's, Zinc ... dis 60 %
" Brass ... dis 50 %

Ox Balls ... dis 50&10

Pencils.
Faber's Carpenters' ... High list, dis 40&10 %
" Round Gilt ... ₩ gross $5.25 net
Dixon's Lead ... ₩ gross 4.50 net
" Lumber ... ₩ gross
Dixon's Carpenters' ... dis 40 & 10 %

Packing, Steam.
N. Y. Belting and Packing Co ... dis 20 %

Picture Nails.
Brass Head, Sargent's List ... dis 50&10 %
" T. & S. Mfg. Co ... dis 40 %
Porcelain Head, Sargent's List ... dis 50&10 %
" " Judd's List ... dis 30 %
Porcelain Head, T. & S. Mfg. Co ... dis 33⅓ %
Niles' Patent ... dis 25 %
Picks and Mattocks ... dis
Pinking Irons ... ₩ doz 75c. net

Plaiting Machines.
Magic ... ₩ doz $10.00, net
Astor Plaiting Machine ... each $15.00, dis 20 %
Crown Plaiting Machines ... dis 25 %
6in.. $6.00. 10in..$8.00 each

Planes and Plane Irons.
Bench, First Quality ... dis 30&5 %
" Second " ... dis 40 %
Moulding ... dis 25&5 %
Bailey's (Stanley R. & L. Co.) new list Jan. '79, dis 20&10 %
The Stanley (S. R. & L. Co.) " " dis 20&10 %
Bailey's "Victor" ... dis 20&10 %
Defiance Adjustable ... dis 20&10 %
Laflin Mfg. Co ... dis 35 %
Plane Irons, Butcher's ... $5.50 to £
" Buck Bros ... $5.00 to £
" Auburn Tool Co.'s ... dis 20 %
" The Globe Mfg. Co. "Baldwin Iron" ... dis 20 %
" Ohio Tool Co ... dis 20 %
" Sandusky Tool Co ... dis 20

Pliers and Nippers.
Button's Patent ... dis 33⅓ %
Hall's Pat. Compound Lever Cutting Nippers No. 3; 5 in. $20; No. 4, 7 in., $30 ₩ doz ... dis 15 %
Humason & Beckley Mfg. Co ... dis 30&10 %
Gas Pliers ... dis 50 %
Eureka Pliers and Nippers ... dis 25 %
Russell's Parallel ... dis 25 %
P. S. & W. Cast Steel ... dis 35 %
" Tinners' Cutting Nippers ... dis 15 %

Plumbs and Levels.
Disston's ... dis 40 %
Stanley R. & L. Co.'s Pat. Adjustable ... dis 65&10 %
" " " Non-Adjustable ... dis 55&10 %
Chapin's Patent Adjustable ... dis 65&10&10 %
" Non-Adjustable ... dis 65&10&10 %
Standard Rule Co.'s New Adjustable ... dis 65&10 %
" " Non-Adjustable ... dis 65&10 %
Johnson's Patent Adjustable ... dis 60&10 %
Pocket Levels ... dis 60&10 %
Davis' Inclinometers ... dis 20 %

Post Hole and Tree Augers.
Samson Post Hole Digger ... per doz $37.50, dis 20 %
Fletcher Post Hole Augers ... ₩ doz 36.00, dis 20 %
Vaughan's Post Hole— 6 in. $23.60; 7, 8 and 9 in. $25 per doz ... dis 20&10 %
Eureka Diggers ₩ doz. $40.00 ... dis 25&10 %
Leed's each $2.50 ... net

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw per doz $19.00, dis 20 %
" Pruning Hook ... " 12.50, dis 20 %
E. S Lee & Co.'s Pruner ... dis 30 %
Pruning Shears ... ₩ doz $5.50@$8.00

Pulleys.
Hot House and Tackle ... dis 65&10 %
Jap'd Screw ... dis 65&10 %
Brass Screw ... dis 60&10 %
Jap'd Side ... dis 65&10 %
" Clothes Line ... dis 60&10 %
Hay Fork Solid Eye ... $4.50; Swivel, $5.00, dis 50&10 %
" " "Anti-Friction," ... $7.50 dis 40&5 %
" " "F" Common and Pat. Bushed ... dis 20 %
" " Tarbox Pat. Iron ... dis 20 %
Shade Rack ... dis 50 %

Punches.
Belt or Drive ... ₩ doz $2.00; 2.25; 2.50, dis 50 %
Bemis & Call Co.'s Cast Steel Drive ... dis 50&5 %
" " Springfield Socket ... dis 50&5 %
Spring ... ₩ doz $7.00, dis 50&5 %
" Leach's Patent ... dis 15 %
Bemis & Call Co.'s Spring and Check ... dis 40 %
Solid, Tinners' ... ₩ doz $1.44, dis 40 %

Rail.
Sliding Door Wrought Brass..... ₩ ℔ 44c dis 30 %
" " Iron, Painted ..₩ foot 4c. dis 10&10 %
Barn Door....Inch..... ⅝ ¾ ⅞
Per 100 feet. $2.00 3.00 5.00—dis 10 %
" for N. E. Hangers—
Small. Med. Large.
Per 100 feet. .. ..$2.10 2.70 3.30—net

Razors.
J. R. Torrey Razor Co.....dis 15 %

Razor Strops.
Genuine Emerson.....dis 60@ 65 %
Badger's Emerson.....dis 60@ 65 %
Badger's (not Emerson).....dis 33⅓ %
Evans'.....dis 40 %
Imitation Emerson..... ₩ doz $2.00, dis 20 %
Hunt's. .....dis 40&5 %
Chapman. .....dis 15 @ 20 %
Saunder's.....dis 10 %
Torrey's .....dis 20 %

Rivets.
Iron and Tinned.....dis 60 %
In bulk, list of May 21.....dis 45 %
Copper Rivets and Burs.....dis 33⅓ %
Nos.. 7 8 9 10 11 12 13 14 15 16
₩ ℔..490 500 520 540 560 580 600 640 700 840
Burr's.....dis 45 %

Rivet Sets.....dis 40 %

Rods.
Stair, Brass.....dis 25 %
Stair, Black Walnut.....dis 40 %
Stair, American Patent .....dis 20 %

Rollers
Barn Door, Sargent's list .....dis 60&10&10 %
Acme (Anti-Friction).....dis 40 %

Rope.—Mnfs' Net List, Oct. 5, 1881, dis on 5000 lbs ℔ and over, 1¼c ₩
Manila.....½ inch and larger ₩ 16
" .....⅜ inch ₩ ℔ 16½c
" .....¼ and 5-16 inch ₩ ℔ 17 c
" Tar'd Rope.....₩ ℔ 15½c
" " Lath Yarn.....₩ ℔ 15½c
" Hay Rope. .....₩ ℔ 16 c
Sisal.....½ inch and larger ₩ ℔ 10½c
" .....⅜ inch ₩ ℔ 11 c
" .....¼ and 5-16 inch ₩ ℔ 11½c
" Hay Rope.....₩ ℔ 10½c

Rules.

	Boxwood.	Ivory.
Caspin's, Standard, Stanley	dis 66⅔&10 %	dis 50&10 %
Stephens	dis 66⅔ & 10	dis 5%

Sad Irons.
From 4 to 10 lbs.....₩ ℔ 33½c net
Self Heating.....₩ doz $9.00 net
" Tailors'.....₩ doz $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Mrs. Pott's Irons, Double Pointed.....dis 40 %
Mrs. Pott's Irons, Square Back.....dis 45 %
Enterprise Star Irons.....dis 45 %
Combined Fluter and Sad Iron..per doz $15.00, dis 15 %

Sand Paper.
Bleeder & Adamson's Flint, 00 to 1½..$4.75 ₩ ream
" " " 2, 2½ & 3. 4.25 ₩ ream
" " " Assorted 4.75 ₩ ream
" " Star..... 3.75 ₩ ream
" " Emery..₩ ream $6.50 @ 11.50
dis 50&5 %
Bartles Flint, same list as B & A.....dis. 25%
" Harrison, $3.75 per ream.....dis 25%
New England, same list as B. & A. Flint.....dis 30 %
Gaze's.....dis 50& 5%

Sash Cord.
Common.....₩ ℔ 16c net
Patent.....₩ ℔ 18c net
Silver Lake, Hemp.....₩ ℔ 40c. dis 10 %
" White Cotton.....₩ ℔ 50c. dis 10 %
" Drab Cotton .....₩ ℔ 55c. dis 10 %
Raw Hide.....dis 25 %
Steel Ribbon.....dis 10 %

Sash Locks.
Clark's, No. 1, $10.00; No. 2, $8.00 per gross.....dis 33⅓%
Ferguson's.....dis 33⅓ %
Walker's.....net
Rammond's Window Springs.....dis 25 %
Northup Window Springs, No. 1, $10.00; ₩ gross..dis 15 %
The Perfect, Clark & Smith, Plain Jap'd ₩ gro $10.00 net
" " Por. Knob Jap'd. ₩ gro 14.00 net
" " Nickel-Plated...₩ gro 27.00 net
Universal .....dis 30 %

Sash Weights.—Solid Eyes, in 500 ℔ lots and over..... ..₩ ℔ 3½c net

Sausage Stuffers or Fillers.
Miles.....₩ doz $20 dis 30 %
Perry.....₩ doz, No. 1: No. 0, $21, dis 30 %
Braw Cut No. 4.....each $30.00, dis 20 %
Enterprise Mfg. Co.....dis 30 %
Silver's.....dis 25%

Saws.
Disston's Circular.....dis 40 %
" Mill.....dis 40 %
" Cross Cut.....dis 40 %
" Hand, Panel, Rip, &c.....dis 20 %
Boynton's Lightning, Cross Cuts, new list.....dis 20 %
" One-Man, all lengths, " .....dis 20 %
" Billet Webs, 30 in. " .....dis 25 %
" Lightning Buck Saws X Par.....dis 30 %
" Lightning Hand, Panel and Rip.....dis 20 %
Wheeler & Clemson Mfg. Co.'s Hand.....dis 20 %
W. M. & C. Mfg. Co. Cross-Cuts, except Monarch, dis 40 %
Livingston's Butcher and Kitchen.....dis 20 %
" Framed Wood—

Nos....	101	102	103	104	105
Per doz..	$10.00	8.50	10.00	7.50	5.25 net

Saw Frames.
White, Vermont.....₩ doz $1.35, dis 25 %
Red, Polished and Varnished.....₩ doz $2.00, dis 10 %
Saw Rods. .....$10 list dis, 10&25 %

Saw Sets.
Boynton's Patent X Cut, per doz. $12.00; Hand Saw, per doz.. $10.00.....dis 20 %
Stillman's Genuine.....₩ doz $3.50 and $5.40 dis 10 %
" Imitation.....₩ do $2.25, dis 20&10 %
Common Lever. .....per doz $3.00, dis 30&10 %
Leach's.....No. 0, $8.00; No. 1, $15.00. dis 25 %
Nash's.....No. 7 $8.50; No. 2, $5.50, dis 20&10 %
Hammer, Hotchkiss.....$4.50, dis 10 %
" Bemis & Call Co.'s New Pat.....dis 30&5 %
Bemis & Call Co.'s Lever & Spring Hammer..dis 30&5 %
" " Plate.....dis 10 %
" " Cross Cut.....dis 12½ %
Aiken's Genuine.....$13.00. dis 40&10 %
" Imitation.....$7 00. dis 40 %
Hart's Patent Lever.....dis 20 %
Disston's.....dis 20 %
Morrill's.....No. 1, $14; No. 2, $11, dis. 40 %

Scales.
Baten, Counter, No. 171.....₩ doz $36. dis 35&10 %
" Tea, No. 181.....₩ doz $16.00 dis 40&10 %
Union Platform.....$6.00. dis 25 %
Fairbanks'.....dis 20 %
Buffalo Scle Co.....dis20&5 %
Forsyth Scale Co.....dis 25 %
Howe's.....dis 20&5 %
Chatillon's Grocers'.....dis 40 %
" Eureka.....dis 25 %
Family Universal.....dis 50 %
" Favorite .....dis 40 %
" Turnbull's.....dis 40 %
Scale Beams, Chatillon's list.....dis 25 %
" Sargent's list.....dis 60&10 %

Scrapers.
Adjustable Box Scraper (S. R. & L. Co.), $6.00.dis 30&10 %
Box, 1 Handle.....₩ doz $4.00, dis 10 %
" 2 " .....₩ doz 6.00 dis 10 %
Defiance Box and Ship.....dis 25&10 %
Foot.....dis 55 %
Ship (common).....per doz $3.00 net
" (Providence Tool Co.....dis 10,%

Screw Drivers.
Douglass Mfg. Co.....dis 20&10&10 %
Disston's.....dis 40 %
Disston's Patent Excelsior.....dis 40 %
Buck Bros .....dis 25 %
Stanley Rule & Level Co., Varnished Hdls..dis 50&10 %
" " " Black Handles...dis 40&10 %
Sargent & Co.'s.....dis 50&10 %
Gay's Double Action Ratchet per doz., 4 in., $9.00; 5 in., $10.20; 6 in., $12.00 dis 30 %
Cowles Hdw. Co., No. 1 Extra.....dis 40&10 %
" " No. 1.....dis 40&10 %
" " Nos. 4 and 20.....dis 30 %
Clark's Patent.....dis 25 %

Screws.
Flat H'd Iron.....New list April 27, 1881.....dis 35 %
Round Head Iron. " " .....dis 30 %
Flat Head Brass... " " .....dis 35 %
Round Head Brass " " .....dis 25 %
Brass and Silver Capped.....dis 35 %
Spanned, list of Plain Screws. .....dis 25
Coach Patent Gimlet Point.....dis 60 %
Coach, Common or Lag.....dis 60 %
Bed.....dis 10 %
Machine, Flat Head, Iron.....dis< %
" Round Head, Iron. " .....dis 50 %
Bench, Iron.....dis 60&10 %
" Wood, Beech.....₩ doz $3.00, dis 10 %
" " Hickory.....dis 20&10 %
Hand.....dis 25&10 %
Hand Rail, Sargent's.....dis 66⅔&10 %
" " Humason, Beckley & Co's .....dis 50 %
" Am. Screw Co., list of Jan. 1, '81.dis 60&10 %
Jack (Wilson's).....dis 25 %

Screw Window Balances.
R. B. Huguin's.....$36.00 per gross, dis 25&10&5 %

Scroll Saws.
Lester, $10.00.....dis 20 %
Rogers, $3.50.....dis 25 %

Shears and Scissors.
American (Cast) Iron.....dis 60&10 %
Clipper Cast Iron.....dis 70&10
Pruning.....see Pruning Hooks and Shears.
Barnard's Lamp Trimmers. .....₩ doz $5.75
Tinners'.....dis 15 %
Seymour's, List, Nov. 25, 1879.....dis 60&10 %
Heinsh's " " .....dis 60 %
" Tailors' Shears.....dis 33⅓ %
Mass. Cutlery Co. St. Trimmers.....dis 75 %

Sheaves.
Sliding Door, M. W. & Co., list.....dis 45&2 %
" R. & E. list.....dis 60&10&2 %
" Patent Roller.....dis 10 %
" " Hatfield's .....dis 60&10&2 %
" Russell's Anti-Friction .....dis 60&10&2 %
" Moore's Anti-Friction.. .....dis 45 %
Sliding Shutter, R. & E. list.....dis 60&10&2 %
" " Sargent's list.....dis 60&10 %
" " Reading list.....dis 55&10 %
Moore's Anti-Friction (Hanging).....dis 45

Shovels and Spades.
Ames, New list, July 1, 1881.....dis 15 %
Griffiths.....dis 10 %
Old Colony.....dis 15 %
Payne Pettebone & Son, new list.....dis 40&10 %
" " R. R. Shovels .....dis 15 %
Remington's (Lowman's Patent).....dis 30 %
Rowland's.....dis 40&10 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.....dis 60&10&2 %
Polished Steel .....new list. dis 50&10&2 %

Slates.
Square Frames.....by case.....dis 70 %
Less than a case.....dis 60&20 %

Spoke Shaves.
Defiance Metallic.....dis 20&10 %
Iron.....dis 45 %
Wood.....dis 30&10 %
Bailey's (Stanley R & L. Co.) new list.....dis 30&10 %
Stearns'.....dis 30&10 %

Spoke Trimmers.
Bonney's.....₩ doz $10.00 dis 40&5 %
Stearn's.....₩ doz $9.00 dis 20&10 %
Ives'.....No. 1, $14.00; No. 2, $12.00 ₩ doz, dis 50&10 %
Douglass'.....₩ doz $9.00. dis 15 %

Spoons.
Basting.....dis 60&10&10 %
Riveted Table and Tea.....dis 55 %
Solid Table and Tea.....dis 55 %
Britannia.....dis 65&5 %
Reed & Barton.....dis 40&5&5 %
Hall & Elton.....dis 40&5&5 %
Holmes, Booth & Haydens.....dis 40&5&5 %
German Silver.....dis 30&10&5 %
Cast Steel, Sil. Plated.....dis 33⅓ %
Tin (P. S. & W.), Teas.....$1.25 ₩ gross, net
" " Tables.....$2.00 ₩ gross, net
Tin Cowles Hdw. Co.).....dis 10 %
" " " case lots.....dis 20 %

Stocks and Dies.
"Lightning" Screw Plate.....dis 10 %

Stone.
Hindostan No. 1, 6 c; Axe, 8c.....dis 20&10 %
Hindostan Hacker Stone.....₩ gross $12.00 dis 10 %
Sand Stone.....₩ ℔ 8c. dis 33⅓&10 %
Washita Stone.....No 1, ₩ ℔ 30c net
" .....No 2. ₩ ℔ 16½c net
" Slips.....No. 1, ₩ ℔ 40c net
Arkansas Stone No. 1, 4 to 6 in.....℔ ₩ $1.35 net.
" " No 1, 6 to 9 in.....℔ ₩ $2.00 net
Turkey Oil Stone (Chase).....4 to 8in, $1.00 ₩ ℔,
" Slips " .....$2.50 ₩ ℔ dis 10 %
Lake Superior (Chase).....₩ ℔ 20c, dis 10&5 %
" Slips " .....₩ ℔ 40c, dis 10&5 %
Grindstones. Family, Loring's.....dis 10 %

Stove Polish.
Joseph Dixon's.....₩ gross $6.00 dis 10 %
Gem.....₩ gross $4.50, dis 10 %
Gold Medal.....₩ gross $6.00, dis 25 %
"Mirror".....₩ gross $6.00, dis 5 %
Ruby.....₩ gross $3.75, net
Rising Sun.....₩ gross $5.75, net
Dixon's Plumbago.....₩ ℔ 80, net

Squares.
Steel.....dis 50 %; full cases, dis 50&10 %
Iron.....dis 50 % full cases, dis 50&10 %
Nickel Plated.....add $2.50 @ $4.00 ₩ doz. net
Try Squares and T Bevels.....dis 50&10
Disston's Try Square and T Bevels .....dis 40 %
Winterbottom's Try and Mitre.....dis 20&10 %

2 % cash

Tacks, Brads, &c.
List of April 2, 1880

Extra 10 % on all.

Tinned Swedes Tacks.....dis 10 %
Tinned American " .....dis 60 %
Swedes Tacks, all kinds.....dis 40 %
Copper Tacks and Nails.....dis 33⅓ %
Swedes Hungarian Nails .....dis 33⅓ %
Gimp and Lace Tacks.....dis 33⅓ %
" " Tinned .....dis 40 %
Finishing Nails.....dis 30 %
Trunk and Clout Nails.....dis 30 %
Common and Patent Brads.....dis 30 %
Basket Nails .....dis 25 %
Brush Tacks.....dis 25 %
Leathered Carpet Tacks.....dis 30 %
American Cut Tacks.....dis 33⅓ %
Cigar Box Nails.....dis 33⅓ %
Chair Nails.....dis 33⅓ %
Double-Pointed Tacks .....dis 40&5 %

Tap Borer
Common and Ring.....dis 20 %
Ives' Tap Borers.....dis 15&10 %
Enterprise Mfg. Co.....dis 30 %

Tapes, Measuring.
American.....dis 20 %
Spring Tapes.....dis 25&10 %

Thermometers.
Tin Case.....dis 70&10 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 25 %
Wood Bottom.....₩ doz $12.00, dis 40&5 %
All Iron.....₩ doz $9.50, dis 40&5 %
Nashua Lock Co.'s.....₩ doz $18 00, dis 60&55 %
Wilson's.....dis 35 %
Tool Cabs.—Winsted.....₩ ℔ 9c. dis 5

Tinners' Tools and Machines.
Machines (P. S. & W.).....list add 20 %
Tools (P. S. & W.).....add 6 %

Transom Lifters.
Wollensak's Patent.....dis35 %
Richer's Patent.....dis 20&10&10 %
Excelsior.....dis 50&10&2 %

Traps.
Game, Newhouse.....dis 30 %
" Oneida Pattern.....dis 40 %
" Blake's Patent.....dis 30 %
Mouse, Wood, Choker.....₩ doz holes, 10@60
" Round Wire.....₩ doz $1.50, dis 10 %
" Cage " .....₩ doz $2.50. dis 10 %
" Catch-em-alive.....₩ doz $2.50, dis 10 %
Rat, "Decoy".....per doz $10.00, dis 10 %

Trowels.
Lothrops Brick and Plastering.....dis 25 %
Reed's Brick and Plastering.....dis 15 %
Diston's Brick and Plastering.....dis 20 %
Peace's Plastering.....dis 30 %
Clement & Maynard's.....dis 20 %
Rose's Brick.....dis 15 %
Brades' Brick.....dis 20 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis55&10 %

Triers.
Butter and Cheese.....dis 25%

Vises.
Solid Box.....List of July 1, '70 dis
" "Crown" (A. H. Hildick) 40 to 100 ℔, 15c net
" Peter Wrights.....15½c
" Wilkinson's.....13½c
Parallel, Parker's.....dis 10 %
" Wilson's.....dis 35 %
" Howard's.....dis 20&10 %
" Merrill's.....dis 15 %
" Sargent's.....dis 60&10 %
" Trenton.....dis
" Backus and Union.....dis 40 %
" Oval Slide.....dis 40 %
" Double Screw Leg.....dis 15&10 %
" Prentiss.....dis 25 %
" Simpson's Adjustable.....dis 25 %
"Family." List.....net
Saw Filers, Bonney's.....₩ doz $24.00, dis 20&10%
" Stearn's.....dis 20&10 %
" Hopkins'.....₩ doz $17.40 dis 10 %
Reading.....dis 40&10 %
Lowell Hand Vises.....dis 20 %
Richardson's Vise and Anvil.....dis 25 %

Washer Cutters.
Smith's Patent .....₩ doz $12.00 dis 25 %
Johnson's.....₩ doz $12.00. dis 33⅓ %
Penny's.....₩ doz $14.00 and $16.00. dis 25 %
Appleton's.....₩ doz $15.00, dis 50&10 %

Washers.—See Nuts and Washers.

Well Wheels.....dis 60&10c&10%

Wire.
Brass and Copper.. List of June 20, 1881.....dis 30 %
Bright and Annealed.....Nos. 0 @ 12, dis 50@ 42½&2 %
" " .....Nos. 19 @ 20, dis 50 %
" " .....Nos. 27 @ 30, dis 50 %
Coppered.....Nos. 0 @ 18, dis 45@47½ %
Galvanized, Nos. 0 to 18.....market list. dis 40@45 %
Tinned, Nos. 0 to 28.....dis 40@45 %
Cast Steel.....dis 40 %
Tinned Broom Wire, Nos. 18 to 26.....dis 55 %
Annealed Fence, Nos. 8 and 9 .....dis 50@42½ %
" Grate, Nos. 10 to 14. .....dis 50@52½ %
Galvanized Telegraph, Nos. 7 to 9 .....₩ ℔ 9c
" " Nos. 10 and 11.....₩ ℔ 10c
" " No .....₩ ℔ 10½ c
Fence Staples.....₩ ℔ 5½ @ 6½c
" Staples, Galvanized.....₩ ℔ 7 @ 7½c
Stubs Steel Wire.....$7.00 to 8
Japanned Barb Fence .....₩ ℔ 10c
Galvanized .....₩ ℔ 11c
Steel Music Wire, Nos. 12 to 27.....₩ ℔ $1.25, net
Turner & Seymour Mfg. Co. Picture Wire..dis 50&20 %
Judd's Picture Wire.....dis 50&20 %
Clothes Line Wire, Galvanized.....₩ coil 250 ℔ 400 net
Wire Cloth, green and drab.....₩ sq. ft, 3 c net

Wrenches.
American Adjustable.....dis 40 %
Baxter's Adjustable "B," list 4 Jan., 1881. dis 20&5 %
" Diagonal.....dis 20&5 %
Coes 'Genuine.....dis
" "Mechanics".....dis
" Pattern, Malleable.....dis 70 %
" Wrought.....dis 60 %
Girard Standard.....dis 60 %
Girard Agt.....70&5 %
Bemis & Call's Patent Combination.....dis 20%
" " Merrick's Pattern.....dis 35 %
" " Briggs' Pattern .....dis 25 %
" " Cylinder or Gas Pipe.....dis 40 %
Van Wagoner & Williams' Basin .....per doz $4.50
Aiken Pocket (Bright).....$6.00. dis 60&10 %
The Favorite Pocket (bright).....per doz $3, dis 60 %
Webster's Pat. Combination.....dis 75 %

Wringers.

		Per doz
Universal, XX	No. 2½	$60.00
" "	No. 3	63.00
" "	No. 1½	71.00
" "	No. 1	93.00
" "	No. 0.	each, 12 00
" "	No. 12.	36.00
" "	No. 18.	25.00
" "	No. 22.	52.00
Peerless,	No. 0, no Cogs	41.00
"	No. 1, "	54.00
"	No. 2½, with Cogs	60.00
"	No. 2, "	64.00
"	No. 3, "	71.00
"	No. 4, "	89.00
Unique,	No. 0	41.00
"	No. 1	54.00
Novelty,	No. 2	60.00
Excelsior,	No. 3.	70.00

dis 50&5 %

Steel.

WOLFF, KAHN & CO.,

MANUFACTURERS OF

Steel Wire

For All Purposes.

Special Finest CAST STEEL WIRE,

MARKET STEEL WIRE, PRIME COPPERED SPRING WIRE, TEMPERED AND UNTEMPERED STEEL WIRES, IN LONG LENGTHS, FOR CRINOLINE, CORSET, LOCK AND BRUSH MAKERS, AND ALL SPECIAL PURPOSES.

ALL KINDS OF FURNITURE SPRINGS.

IMPORTERS OF

IRON STEEL, & RAILS

OF EVERY DESCRIPTION.

WIRE RODS, PLAIN AND GALVANIZED WIRES, &c.,
GUN BARRELS, MOULDS, AND ORDNANCE.

Shipments in bond from American Ports and direct from Europe to all parts of the World.

EXPORTERS AND GENERAL MERCHANTS.

WORKS, PEEKSKILL, N. Y.

Direct all communications of the

OFFICE & WAREHOUSE, 93 John St., New York.

MILLER, METCALF & PARKIN,

Pittsburgh, Pa.,

Manufacturers of

CRESCENT STEEL,

In Bars, Sheets, Cold-Rolled Strips, &c.

Polished, Compressed Drill Rods and Wire,

Warranted equal to any imported in *quality, finish and accuracy.*

Also Common Grades.

Established 1810.

J. & RILEY CARR,

SHEFFIELD, ENGLAND.

Manufacturers of the "Celebrated

"DOG BRAND" FILES.

Also of Superior

STEEL

For Drills, Cold Chisels, Tools, Taps, Dies, &c.

COLD ROLLED STEEL for Clock Springs, Corsets, &c.

SHEET CAST STEEL for Springs, Saws, Welding and Stamping Cold, &c.

GERMAN, MACHINERY, ENGLISH AND SWEDES SPRING STEEL,

And all other descriptions for machinists and agricultural purposes.

Warehouse, 30 Gold Street, New York.

Near John Street. **HENRY MOORE, Agent.**

S. & C. WARDLOW,

Sheffield, England,

Manufacturers of the Celebrated

Cast and Double Shear

STEEL.

In Bars, Sheets and Coils, for fine Pen and Pocket Cutlery, Table Knives, Mining Tools, Dies, Files, Clock and other Springs, and Tools of every variety.

Warehouse, 95 John Street, New York.

WILLIAM BROWN, Representative.

Cleveland Rolling Mill Co.,

Manufacturers of

BESSEMER STEEL

AND

Iron Rail and Fastenings,

SPRING STEEL

AND

WIRE OF ALL KINDS,

Tire, Axles and other Forgings,

Boiler Plate, Galvanized and Black Sheet Iron, Corrugated Roofing and Siding of Siemens-Martin, Bessemer Steel and Iron.

CLEVELAND, OHIO.

Western Agency,	New England Agency,
91 Lake Street, Chicago.	**239 Franklin Street, Boston.**
N. D. PRATT, Agent.	JOHN WALES & CO., Agents.

THE MIDVALE STEEL CO.,

NICETOWN, PHILADELPHIA.

Best Warranted Cast Steel for Machinists' Tools,

Taps, Dies, Punches, Shear Blades, Chipping Chisels and Granite Rock Drills,

Extra Mild Center Steel, special for Taps,

ALSO,

MACHINERY AND CAST SPRING STEEL, HEAVY AND LIGHT FORGINGS.

Warehouse, No. 12 North 5th St., Philadelphia.

Address *A. M. F. Watson*, General Sales Agent.

STEEL Gautier Steel.

See Page 3.

Steel.

NEWARK STEEL WORKS.

BENJAMIN ATHA & CO.,

Manufacturers

BEST REFINED CAST STEEL

And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

Warranted most superior for TOOLS AND GRANITE ROCK DRILLS.

A full assortment of this universally approved OLD BRAND and other Steels for sale by

EDWARD FRITH & SON, Agents,

No. 241 Pearl St., New York.

LABELLE STEEL WORKS.

SMITH, SUTTON & CO.,

MANUFACTURERS OF ALL KINDS OF

STEEL.

Also Springs, Axles, Rake Teeth, &c.

OFFICE & WORKS, Ridge, Lighthill & Belmont Sts., & Ohio River, Allegheny,

Post Office Address, Pittsburgh, Pa.

Represented at Boston by WETHERELL BROS., 21 Oliver St.; at Philadelphia by JAMES C. HAND & CO. 614 and 616 Market St.; at Cleveland by CONDIT, WICK & CO., 153 Water St.

ALBANY & RENSSELAER IRON & STEEL CO.,

Troy, N. Y.,

Office in New York City, 56 Broadway,

MANUFACTURERS OF

BESSEMER STEEL RAILS,

Machinery Steel, Merchant and Ship Iron.

HORSE SHOES.

SAM'L G. B. COOK & CO., Agents for Southern States,

67 and 69 German Street, Baltimore, Md.

FRANCIS HOBSON & SON

97 John Street, NEW YORK,

Sole Manufact'rs of **"CHOICE"** Extra Cast Steel.

Manufacturers of all Descriptions of Steel.

Manufacturers of Every Kind of Steel Wire.

Don Works, Sheffield, England.

CHAS. HUGILL, Agent.

THE

STEEL COMPANY OF SCOTLAND, LIMITED

(SIEMENS' PROCESS,)

MANUFACTURERS OF

Steel Rails,	Steel Ship Plates.
Steel Blooms for Rails,	Steel Boiler Plates,
Steel Blooms for Wire,	Steel Angles,
Steel Wire Rods,	Steel Forgings,
Steel Locomotive Fire Boxes,	Steel Castings.

JAMES LEE & CO.,

Resident Agents for the United States,

72 Pine Street, New York.

GEO. SANDERSON & CO.,

MANUFACTURERS AND

Importers of STEEL,

Removed to 30 Gold Street, New York.

Particular attention is paid to quality and temper for FILES, SAWS, EDGE TOOLS, TABLE and POCKET CUTLERY, TOOLS, TAPS and DIES; also for COLD ROLLED STEEL for CLOCK SPRINGS, CORSET CLASPS, &c.

A Large Assorted Stock of JOHN ROTHERY'S FILES always on hand.

Warranted Superior to any Steel in the Market, either English or American, for every purpose.

Also,

Combination Chrome Steel and Iron for Safes, Jails and Deposit Vaults.

Send for Circular and Price List.

CHROME CAST STEEL.

Chrome Steel Works,
Kent Avenue and Keap Street,
BROOKLYN, E. D., N. Y.

Chicago Branch,
40 Dearborn Street,

Cincinnati Branch,
123 Central Avenue,

JOLIET STEEL COMPANY,

MANUFACTURERS OF

Steel Rails,

ALL WEIGHTS.

The Company Warrant its Rails equal in quality to any manufactured in the United States.

ALEX. J. LEITH, President.
W. R. STIRLING, Treasurer
C. E. SARGEANT, Secretary

CHICAGO.

H. S. SMITH, General Sup't.
JOLIET.

Office, Rooms D and E, Honore Building. **Works, Joliet, Ill.**

Steel.

R. MUSHET'S

Special Steel

FOR

LATHES, PLANERS, &c.

Turns out at least **double work** by increased speed and feed, **and cuts harder metals** than any other Steel. Neither hardening nor tempering required.

Sole Makers,

SAMUEL OSBORN & CO.,

Sheffield, England.

Represented in the United State by

B. M. JONES & CO.,

Nos. 11 & 13 Oliver Street, **BOSTON.**

NAYLOR & CO.,

99 John St., New York. 6 Oliver St., Boston, Mass.

W. R. HART, Agent,

208 S. Fourth St., Philadelphia, Pa.

IMPORTERS OF

STEEL AND IRON RAILS,

Tin and Terne Plates,

Swedish and Norway Iron,

BESSEMER STEEL WIRE RODS,

Pig Iron, Spiegeleisen, Ferromanganese, Scrap Steel and Old Iron Rails.

MANUFACTURERS OF

STEEL COMPRESSED SHAFTING,

"Benzon" Homogeneous Plates

For Boilers, Fire-boxes, &c.

Axles, Crank Pins, Spring Steel,

And all other kinds of

Martin-Siemens Steel and Iron

For Railroad purposes.

REYNOLDS, CARTER & REYNOLDS,

3 Clements Lane,

Lombard Street, **LONDON, E. C.**

Cable Address:

REYNOLDS,

London,

Iron and Steel Merchants

AND

ENGINEERS.

Exporters of

Iron and Steel Rails, Blooms, Spiegeleisen, Pig Iron, Old Rails, Scrap Iron, Iron Ore, and all kinds of Railway Plants, Engines and Piping for Water-works, Mining Machinery, &c.

JOHN H. WRIGHT,

Manufacturer of

MACHINISTS' TOOLS

FROM THE LATE

WOOD, LIGHT & CO.'S PATTERNS

Of Lathes and Planers.

Mr. Wright having formerly been a contractor in building the same, will give superior work to all who favor him with their orders.

Gear Cutting a Specialty.

237 Water Street,

BRIDGEPORT, CONN.

A. PARDEE, Hazelton, Pa. J. G. FELL, Phila.

A. PARDEE & CO.

237 South Third St.,

PHILADELPHIA,

No. 111 Broadway, New York.

MINERS AND SHIPPERS OF

Lehigh Coals.

The following superior and well-known Lehigh Coals are mined by ourselves and firms connected with us, viz.

A. Pardee & Co.	HAZLETON, CRANBURY, SUGAR LOAF.
Pardee, Bro. & Co.	LATTIMER.
Calvin Pardee & Co.	HOLLYWOOD.
Pardee, Sons & Co.	MT. PLEASANT.

EMPIRE STATE MFG. CO.

BUFFALO, N. Y.

Copper,
Half Copper,
Nickel Plated
TEA KETTLES.
Metal Spinning.

B. KREISCHER & SONS,

FIRE BRICK.

BEST AND CHEAPEST.

Established 1845.

Office, foot of Houston Street, East River, NEW YORK.

NEWTON & CO.,

ALBANY, N. Y., Manufacturers of

FIRE BRICK

Stove Linings,

Range and Heater Linings

Cylinder Brick, &c., &c.

For Glass and Steel Works.

SILICA,

Bricks and Cement,

English Fire Bricks.

RIMINGTON BROS. & CO.,

Newcastle-on-Tyne.

Agent on this side

S. A. RIMINGTON,

40 & 42 Broadway,

NEW YORK.

M. D. Valentine & Bro

Manufacturers of

FIRE BRICK

And Furnace Blocks

DRAIN PIPE & LAND TILE.

Woodbridge, - - - N. J.

BORGNER & O'BRIEN,

Manufacturers

FIRE BRICK

AND

Edge Pressed Furnace Blocks,

CLAY RETORTS, TILES, &c.,

Twenty-third Street,

Above Race, *PHILADELPHIA.*

Twenty years' practical Experience.

WATSON FIRE BRICK CO.,

ESTABLISHED 1836.

Successors to JOHN R. WATSON, Perth Amboy, New Jersey

Manufacturers of

FIRE BRICK,

FOR ROLLING MILLS, BLAST FURNACES, FOUNDRIES GAS WORKS, LIME KILNS, TANNERIES, BOILER and GRATE SETTING, GLASS WORKS, &c.

Fire Clays, Fire Sand, and Kaolin for Sale.

HENRY MAURER,

Proprietor of the

Excelsior Fire Brick & Clay Retort Works,

Manufacturer of **FIRE BRICK, HOLLOW BRICK AND CLAY RETORTS.**

WORKS: PERTH AMBOY, NEW JERSEY.

Office & Depot, **418 to 422 East 23d St., N. Y.**

TROY FIRE BRICK WORKS,

Troy, N. Y.,

JAMES OSTRANDER & SON,

ESTABLISHED 1845,

Manufacturers of

FIRE BRICK,

Tuyeres, Tiles, Blast Furnace Blocks, &c. Miners and Dealers in Woodbridge Fire Clay and Sand, and Staten Island Kaolin.

Established 1864.

GARDNER BROTHERS,

Manufacturers of

STANDARD SAVAGE FIRE BRICK,

TILE & FURNACE BLOCKS,

OF ALL SHAPES AND SIZES.

Clay Gas Retorts and Retort Settings, and Miners and Shippers of Fire Clay.

OFFICE: 116 Smithfield St., Pittsburgh, Pa.
WORKS: Mt. Savage Junction, Md., and Lockport, Pa.

HALL & SONS,

FIRE BRICK,

Buffalo, N. Y.

CHAS. D. COLSON,

FIRE BRICK,

Foundry Facings, Sand, Tools and Supplies.

CHICAGO, ILL.

UNION MINING COMPANY.

Mount Savage Fire Brick.

EDWARD J. ETTING, Agent,

No. 230 South Third St., Philadelphia, Pa.

THOMAS MORTON,

Manufacturer of

CABLE, COPPER, IRON AND STEEL SASH CHAINS,

for suspending window sashes. Also, Copper Champion Chains, with patent attachments, for same purpose. Agents wanted in the principal cities in the United States. Apply at

65 Elizabeth Street, New York.

HENRY DISSTON & SONS,

KEYSTONE SAW, TOOL, STEEL & FILE WORKS,

Front and Laurel Streets, PHILADELPHIA.

DISSTON'S SAMSON TREE PLANTER AND POST HOLE DIGGER.

Fig. 1.

Patented May 29, 1870.

Price, - - - $37.50 per dozen.

No Farmer, Nurseryman, Railroad or Telegraph Company

SHOULD BE WITHOUT ONE.

NO BACK-ACHE.

NO KNEE-WORK.

NO CLOGGING.

This tool has been thoroughly tested, and has given the greatest satisfaction to all who have tried it. The principle on which it works makes it self-cleaning and prevents adhesion in sticky soil; therefore it always works free and easy. It is far superior to all plungers, augers and boring machines, as it works well in stony, sandy, or clay soils; quicksand under water is as easily removed as though no water existed.

Fig. 2.

DIRECTIONS.

Plunge the Digger into the ground, as shown in cut, Fig. 1, and when the soil is loosened pull out the lever with one hand, as shown in cut, Fig. 2, which will press the dirt between the blades; then draw the Digger from the hole, keeping hold of the lever with one hand and the handle with the other. When the Digger is clear of the hole, you can deposit the load anywhere within reach by simply pressing down the lever, which will open the blades and the dirt will fall from between them. The Digger is then ready for another plunge. The steel blades are nine inches long, and the whole tool five feet long. *For sale at Hardware and Agricultural Stores.*

HENRY DISSTON & SONS.

STANDARD SHAFT COUPLING SPRING.

Patented.

CHICAGO, July 24, '81.

Gentlemen:

You may enter our order for 5000 sets of your Standard Shaft Coupling Springs (600 sets a month).

A. A. ABBOTT & CO.

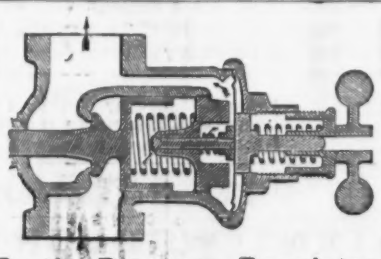
Side View.

Front View.

One dozen pairs, japanned expressed to the responsible Hardware or Carriage trades for $1.50 (per gross, $15, 4 mos. note, 5 per cent. off 30 days, 10 off spot cash). Discount to jobbers. Splendid selling article for commercial travelers. (Nickel plated springs $3 per doz. pairs. Dealers and the trade also supplied by the E. D. Clapp Mfg. Co., Auburn, N. Y., and Wilcox & Howe, Birmingham, Conn.; Crandall, Stone & Co., Mfrs. Carriage Trimmings, Binghamton, N. Y. Perfect Anti-Rattler and Shaft Bolt Locker, and looks neat on a buggy. Sold by all hardware dealers everywhere. Orders, large or small, filled promptly.

A. G. MOREY & CO., 90 Randolph Street, (McCormick Block), CHICAGO,

Manufacturers for U. S. & Canada, under Letters Patent.



Curtis Pressure Regulator.

Is made entirely of metal; occupies the same space as a globe valve. It has no glands or packing, and is a lock-up valve. Write for circular. Manufactured by

CURTIS REGULATOR CO.,

59 Beverly Street, BOSTON, MASS.

HOWARD IRON WORKS,

BUFFALO, N. Y.,

Manufacturers of

BENCH VISES,

Price Lists sent on application.

T. NEW'S PREPARED ROOFING

For steep or flat roofs. Applied by ordinary workmen at one-third the cost of tin. Circulars and samples free.

T. NEW, 39 John St., New York.

BARRETT, ARNOLD & KIMBALL, Western Agts., Chicago, Ill.

STEEL BRASS RUBBER **STAMPS** STENCIL BRANDS PAINT *STAMPING INK &c.*

A. M. MICHAEL, ALBANY, N. Y.

B. FITTS PATENT MAGNETIC METAL SEPARATOR,

Manufactured by

EZRA SAWYER,

33 Hermon St., WORCESTER, MASS.

Gentlemen.—This cut illustrates our

CAST IRON

Furnace Lamps

which are superceding entirely the Tin Lamps wherever introduced, in consequence of their durability. They are now extensively used in the Iron Districts of Ohio and some in Pennsylvania.

We call your attention to and solicit your order for them, confidently asserting that they are an **A No. 1 article in every respect.**

Sample sent if desired.

PRICE, $12 PER DOZEN.

Taylor & Boggis,

CLEVELAND, O.

WILEY & RUSSELL MFG. CO.,

Greenfield, Mass.

LIGHTNING

Screw-Cutting Machinery and Tools.

Bolt Cutters, for hand or power.
Screw Plates, cutting from wire sizes to 1½ inch.
Green River Drilling Machines, for hand or power, with screw-cutting attachment.
Green River Tire Benders.
" Tire Upsetters.
" Tire Measuring Wheels
Tire Bolt Wrenches, Nut Wrenches.
Horse Shoers' Vises.
Taps and Dies for pipe, Bit Braces.
Taps, Dies and Reamers, &c., &c.

Send for Illustrated Price List.

THE GREEN RIVER TIRE UPSETTER.

GREEN'S PURE SILICA FIRE BRICK,

MADE BY

LACLEDE FIRE BRICK MANUFACTURING CO.,

SPECIALLY ADAPTED FOR

Pernot and Siemens Open Hearth Steel Furnaces and for Glass Furnaces.

Office, 901 Pine St., St. Louis, Mo.

John T. Lewis & Bros.

No. 231 South Front St., PHILADELPHIA.

JOHN T. LEWIS & BROS. WARRANTED PURE WHITE LEAD. PHILADA.

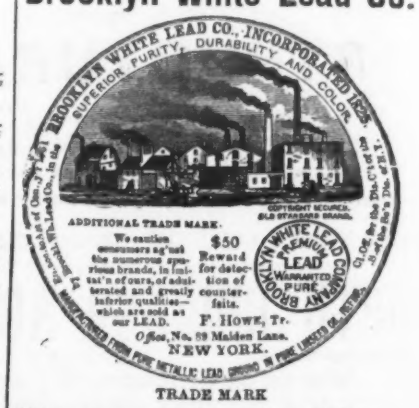
TRADE MARK.

MANUFACTURERS OF

Pure White Lead, Red Lead, Litharge, Orange Mineral, Linseed Oil,

AND PAINTERS' COLORS.

Brooklyn White Lead Co.



TRADE MARK

White Lead, Red Lead & Litharge.

No. 182 Front Street, NEW YORK,

JOHN JEWETT & SONS

Manufacturers of the well-known brand of

WHITE LEAD.

JEWETT & SONS, PERFECTLY PURE WHITE LEAD.

TRADE MARK

ALSO MANUFACTURERS OF

LINSEED OIL.

181 Front Street, NEW YORK.

ATLANTIC WHITE LEAD & LINSEED OIL CO. PURE WARRANTED ROBERT COLGATE & CO. TRADE MARK

The Atlantic White Lead and Linseed Oil Co.,

Manufacturers of

White Lead (Atlantic), Red Lead, Litharge, Glass Makers' Litharge and Orange Mineral;

LINSEED OIL,

Raw, Refined and Boiled.

ROBERT COLGATE & CO.,

287 Pearl St., NEW YORK.

A. F. PIKE.

Pike Station, - - New Hampshire,

Manufacturer and Wholesale Dealer in

Bluestone

For Scythes, Axes, Knives and Turpentine Hacks.

Factories at Pike Station, N. H., and Evansville & Westmore, Vt.

Genuine Old Reliable,
Indian Pond (Red End),
Premium, Union,
White Mountain,
Letoile, Hacker,
Diamond Grit,
The New Boss,
Lamoille, Rugg,
Willoughby Lake,
Green Mountain,
Black Diamond,
Mowing Machine,
German Pattern,
Chocolate, Ax Bitts,

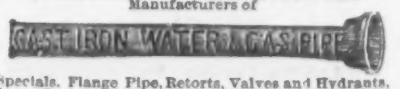
Stones made, labeled and branded in any style desired. PRICE and QUALITY GUARANTEED. All the above brands are of clear, even grit and *will not glaze.*

Mellert Foundry & Machine Co.,

Limited,

(Works Established at Reading, Pa., in 1848.)

Manufacturers of



Specials, Flange Pipe, Retorts, Valves and Hydrants, Lamp Posts, &c. **The Improved Canadian Turbine Water Wheel,** Machinery and Castings for Furnaces, Rolling Mills, Grist and Saw Mills, Mining Pumps, Hoists, &c. Columns, Brackets, Iron Railings, &c.

Offices:

Second and Chestnut Sts., Reading, Pa., and 74 Pine Street, New York City.

THE BEST NUT TAPPERS RAPID BOLT CUTTERS LATEST IMPROVEMENTS PURDY MACHINE CO. 53 CENTER ST. CLEVELAND

PHILADELPHIA.

Corrected Weekly by Lloyd, Supplee & Walton.)

erms, 30 days. For 60 or 90 days, interest added at 10 per cent. per annum.

Anvils.
Peter Wrights, ₩ lb ..10¾c
Over 250 lbs ..11c
Eagle (American) ..10c ₩ lb—dis 20 %

Apple Parers.
Penn Apple Parer ..$6.50
Rotary Peach Parers ..13.50
Lots of 10 to 25 dozen special prices.

Axes.
Hunt's Kentucky and Yankee..per doz $9.50 @ 10.00
Mann's Red Warrior .. " 9.00 @ 9.50
Richland Chief .. " 8.50 @ 9.00
Beveled Axes .. add 50c " net
Double Bit Axes .. net 19.00

Augers and Auger Bits.—New List January 1.
Bates' Nut Augers ..dis 40 %
Cook's Augers ..dis 40&10 %
Watrous' Ship Augers ..dis 15 %
Benjamin Pierce Auger Bits ..dis 35 %
Griswold Auger Bits ..dis 40 %
Cook's " ..dis 40&10 %
Jennings' " ..dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $48 ₩ doz..dis 25&10 %
Stearns' Pat. Hol. Augers, list $48 ₩ doz..dis 20&10

Balances.
Light and Common ..dis 15&10 %

Bells.
Bevin Bros. Mfg. Co. Light Hand Bells..dis 65&10 %
Swiss Pattern Hand Bells..low list dis 40&10 %
Connell's Door Bells ..dis 20 %
Gt. Western & Kentucky Cow, new list ..dis 50 %

Bolt and Rivet Clippers.
Chambers' No. 1. for ⅝ bolt..each, $7.00
" No. 2, " ½ " .. " 9.00 } dis 15 %
" No. 3, " ⅜ " .. " 12.00

Boring Machines.
Upright, without Augers..List 5.50 }
Angular, without Augers.. " 6.75 } dis 40 %

Bolts.—Eastern Carriage Bolts ..dis 80 %
Philadelphia " ..new list dis 70&10 %
Stanley, Wrought Shutter ..dis 50&10 %

Braces.—Barber's ..dis 40&5 %
Backus ..dis 50 %
Spofford ..dis 50&5 %
American Ball ..dis 55 %

Butts.—Cast Fast Joint, Narrow ..dis 40&10 %
" " Broad ..dis 40&10 %
Cast Loose Joint, Narrow ..dis 50&10 %
" " Broad ..dis 50&10 %
" Acorn, Loose Pin ..dis 40&10 %
" " Jap'd ..dis 55&10 %
" Mayer's Loose Joint ..dis 50&10 %
Wrought Loose Pin ..dis 40&10 %
" Table Hinges and Back Flaps ..dis 40&10 %
" Narrow, Fast ..dis 45&10 %
" Loose Joint ..dis 50&10 %

Blind Butts.
Parker ..dis 70 %
Clark ..dis 70 %
Shepard ..dis 70 %
Lull & Porter ..dis 66⅔&10 %
Huffer's ..dis 40 %

Chains.—German Halter and Coil, new list Oct. 22, 1879 ..dis 50&10 %
Galvanized Pump ..₩ lb 9½c net
Best Proof Coil Chain—English.
₩ lb.. 12 10 8½ 7½ 7¼ 7 gold
3-16 ¼ 5-16 ⅜ 7-16 ½ in.

Chisels.—Socket Framing ..dis 65&10 %
Socket Firmer ..dis 65&10 %
Butcher's ..$5.00 to £ gold

Casters.—Bed (new list July 1, 1880) ..dis 40&5 %
Plate ..dis 40&5 %

Coffee Mills.—Box and Side, new list Jan. 1, 1880 ..dis 45 %
Enterprise ..dis 30 %

Cutlery.—Walden Pocket ..new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s ..dis 65&10 %
Adjustable Handle ..dis 15 %

Fry Pans.
Tinned ..dis 45 %
₩ doz.$3.50 4.00 4.50 5.00 5.50 6.50 7.50 9.00 10.00
No.... 0 1 2 3 4 5 6 8
Burnished ..dis 60&10 %
₩ doz.$3.00 3.75 4.25 4.75 5.25 6.00 7.00 8.00 9.00
No.... 0 1 2 3 4 5 6 7 8

Flies.
Nicholson ..dis 40 %
Disston ..dis 40 %
Butcher ..
Spencer ..$4.50 @ 4.75 £
E. M. Boynton, new list ..25 %

Fluting Machines.
Eagle—3½ in. roll ..each, $2.15 }
" —5½ in. roll .. " 2.85 } dis 25 %
Crown—4½ in. roll .. " 3.50 }
" —6 in. roll .. " 4.00 } dis 25 %
" —8 in. roll .. " 6.50 }
Geneva Fluter ..dis 25 %
Favorite com. Fluter & Sad Iron ..₩ doz $10.50 net

Hammers.
Yerkes & Plumb's, new list ..dis 30 %

Handles.
Boynton's Pat. Saw Handles ..35c per pair net.

Hatchets.
Yerkes & Plumb, new list ..dis 30 %
Hunt ..dis 20&10 %

Hinges.
Strap and T ..dis 45&10&10 %

Horse Nails. Nos. 5 6 7 8 9 10
Ausable ..30 27 25 24 23 22
" Foi'ed & Pt'd and Blued and Pointed..31 28 2 25 24 23
Globe ..New list. 28 25 23 22 21 20
Clinton ..22 20 19 18 17
" Polished & Pointed..23 21 20 19 18
Porter, all sizes ..₩ lb 15c. net
Discount on Ausable and Clinton, 30 %; Globe, 10%

Locks and Knobs.
Branford ..dis 45&2 %
Gaylord Cabinet ..dis 25&2 % cash
American Padlocks ..dis 40 &2 % cash
Scandinavian Padlocks ..dis 50 %
₩ doz..$5.00 5.50 6.50 7.50 8.50 10.50 12.50 } dis 60 %
No..... 57 58 59 60 62 63 }
₩ doz ..$18.00 26.00 33.00 } dis 60 %
No ..64 65 66 }

Lanterns.
Square Candle and Oil ..₩ doz
Tubular ..No. 0, $8.65; No. 1, $10.15 ₩ doz net
Globes, 35 cents extra per doz. net.

Lawn Mowers.—Pennsylvania ..
Philadelphia ..} new list
Excelsior ..} dis 30 %

Lawn and Garden Pumps.
Holland Patent ..List $5.00 dis 10 %

Mattocks.
Long and Short Cutter ..new list....35 %
Pennsylvania Pattern ..per doz 35 %

Molasses Gates.
Enterprise Mfg Co 's Measuring Faucets.... dis 30 %
Stebbins' Gates ..dis 80 %
Lincoln's " ..dis 40&10 %
Landers, Frary & Clark's Petroleum ..dis 20&10 %
Brass Liquor Cocks, new list Jan. 1 1880 .. dis 40 %
Cork Lined .. dis 70 %

Meat Cutters.—Penna'vania Meat Cutter..dis 40&10 %
Dixon's ..dis 30 %
Woodruff ..dis 30 %
Stowe ..dis 30 %
Hale's ..new list, dis 10, 10&2 cash
American ..dis 25 %
Stuffers ..dis 30 %
Enterprise Stuffers ..dis 30 %

Planes.—Ohio Tool Co ..dis 30&5 %
Scioto ..dis 40 %
Auburn ..dis 40&5 %
New York Tool Co ..dis 40 %
Bailey ..dis 20&10 %

Plane Irons.—Ohio Tool Co ..dis 20 %
Butcher's ..£, $5.40

Plumbs and Levels.
Stanley's Adjustable ..dis 65&10 %
" Non-Adjustable ..dis 65&10 %

Picks.—New list ..35 %

Pumps.—Bickford ..$5.00, dis 10 %

Rules.—Stanley Boxwood ..dis 66⅔ &10 %
Stanley Ivory ..dis 55&10 %

Steelyards.—Hart's Pattern ..dis 30&10 %
₩ dos.....$14.50 17.75 21 00 26.50 31 00 35.50
Lbs 50 100 150 200 250 300
American Pattern ..dis 30&10 %
₩ doz.....$8.00 10.25 13.75 15.50 16.75 19.50
Lbs..... 50 100 150 200 250 300

Squares.
Steel and Iron ..dis 50 %; full case, dis 50&10 %
Try Squares, Stanley ..dis 50&10 %
Disston's Try Squares ..dis 40 %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened ..₩ doz $9.00 net
Clipper No. 10, Bronzed Blade, Boxed and Sharpened ..₩ doz $8.50 net
Clipper No. 5, Painted Red, Boxed and Sharpened ..₩ doz $8.00 net

Saws.—Disston's Hand, Panel and Rip ..dis 20 %
Disston's Circular ..dis 40 %
Cross-Cut No. 2, Plain Tooth ..dis 40%
" Patent Tooth ..dis 40%
" Champion Tooth ..dis 40%
Boynton's Lightning Cross Cut, new list ..dis 20 %
" One Man, all lengths, " ..dis 20 %
" Billet Webs, 30 inch, " ..dis 25 %
" Lightning Buck Saws, cross bar ..dis 25 %
" " Hand, Panel and Rip..dis 25 %

Shovels and Spades.
Oliver Ames & Sons, new list ..dis 15 %
Griffiths ..dis 40&10 %
Rowland ..dis 40&10 %

Sad Irons.—1 to 10 lbs ..₩ lb 3½c
Mrs. Potts' Patent ..dis 10 %

Stone.—Arkansas Oil Stone ..₩ lb $2.00 net
Washita Extra ..₩ lb 28c net
" No 1 .. " 22½c
" No. 2 .. " 18c
" Slips .. " 45c
" Axe .. " 130 net
Turkey Oil Stone No. 1 .. ₩ lb $1.00 net
Hindostan Oil Stone No. 1 .. ₩ lb 60c }
" Axe Stone .. " 80 } dis 20 & 10 %
" Slips .. " 100 }

Screws.
Flat Head Iron ..dis 35 %
" " Brass ..dis 35 %
Round Head Brass ..dis 25 %
" " Iron ..dis 30 %

Spoons.
Plated ..dis 40, 5&c %
German Silver ..dis 30, 10&5 %
Britannia, Boardman's ..dis 65&5 %
" Parker's ..dis 65&5 %
Tinned ..dis 10 %

Springs.—Torrey ₩ doz $2.10 10 %
Philadelphia ..5 in., $4.00; 8 in., $7.75 ₩ doz. dis 25 %
Chatfield No. 1, $2.75; 2, $3.25; 3, $5.00 ₩ doz, dis 33⅓ %
Gem Coil No. 1, Large Jap'd ..₩ doz $4.00 }
" No. 2, Medium Jap'd .. " 2.75 } 25&10 %
" No. 3, Small Jap'd .. " 2.00 }

Stocks and Dies. ..dis 10&5 %

Stove Polish.—Gem ..₩ gross, $4.50, dis 5 %
Dixon ..₩ " 6.00, dis 10%
Onyx ..₩ " $4.00 @ 2.25 net

Tacks. ..dis 50&10 %
Shoe Nails—4 8, 0½c; 3½-8, 10c ₩ lb ..10 %
Double Pointed Tacks ..dis 40&5 %

Traps.
Genuine Oneida—Newhouse ..dis 35 %
Im. Oneida—Newhouse list, first qual ..dis 55 %

Vises.—Solid Box, Trenton new list ..dis 35 %

Wrenches.—Agricultural ..dis 70&5 %
Coes' Genuine ..dis 50&3 %
" " Mechanics' ..dis 60&10 %
" " Mall Bar ..dis 75 %
Philada. Tool Co., Duplex ..dis 20&5 %

Wire.
Bright or Ann'd, No. 0 to 18 ..dis 50 to 52½ %
" No 19 to 26 ..dis 57½ to 60 %
" " No. 27 to 36 ..dis 62½ to 65 %
Coppered, 0 to 18 ..dis 47½to 50 %
Tinned Broom Wire ..dis 52½ to 55 %
Galvanized No. 7 to 18....Market List, dis 42½ to 45 %

Wringers.
Peerless No. 2½ ..
" " 2 ..
Universal, No. 2½ ..
" " 2 ..
Novelty, No. 10 ..
" " 2 ..

PITTSBURGH.

Merchant Iron.

TERMS.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.

The following are card rates.

Flat Bar.
1½ to 4 by ⅜ to 1 inch ..2.5c
4½ to 6 by ⅜ to 1 " ..2.6c
1¾ to 6 by 1⅛ to 1¼ " ..2.9c
1¼ and 1⅜ by ⅜ to ¾ " ..2.6c
1 and 1¼ by ⅜ to ¾ " ..2.7c
⅝, ¾ and ⅞ by ⅜ to ⅝ inch ..2.9c

Rounds and Squares.
1 to 1⅞ ..2.5c | ¾ to 9-16 ..2.7c
2 to 2⅝ ..2.7c | ⅝ to 7-16 ..2.9c
2⅝ to 3¼ ..3.0c | ⅜ " ..3.1c
3⅛ to 4 ..3.5c | 4-16 ..3.3c
4¼ to 5 ..4.0c | ¼ " ..3.5c
5¼ to 7½ ..2.6c | 3-16 ..5.5c

Oval Iron.
⅞ to 1⅜ ..2.9c | ¼ ..3.3c
⅝ to ¾ ..3.1c | ⅜ ..3.7c

Half Oval and Half Round.
⅞ to 1¼ inch ..3.2c | ¼ inch ..4.0c
⅝ to ¾ " ..3.7c | ⅜ " ..5.5c

Horse Shoe.
⅝ to 1⅛ by 5-16 to ⅞ inch ..3.9c

Wagon Box Iron.
⅞ Inch, Nos. 13 and 14 ..3.7c
⅞ " " 11 and 12 ..3.9c
⅝ " " 13 and 14 ..4.0c
⅝ " " 11 and 12 ..3.8c
⅝ " " 13 and 14 ..4.4c
⅝ " " 11 and 12 ..4.1c

Heavy Bands.
3½ to 6 by ¼ and 5-16 inch ..2.7c
1¾ to 3½ by ¼ and 5-15 " ..2.7c
1 to 1¾ by ¼ and 5-16 " ..2.8c
¾ to 1⅛ by ¼ and 5-16 " ..3.0c
⅝ and ⅞ by ¼ and 5-16 " ..3.5c

Light Bands.
1½ to 6 by ⅛ to 3-16 ..3.0c
1½ to 6 by Nos. 11 and 12 ..3.1c
1 to 1¾ by ⅛ to 3-16 ..3.1c
1 to 1¾ by Nos. 11 and 12 ..3.2c
⅞ and 13-16 by ⅛ to 3-16 ..3.4c
⅞ and 13-16 by Nos. 11 and 12 ..3.5c
⅝ and 11-16 by ⅛ to 3-16 ..3.7c
⅝ and 11-16 by Nos. 11 and 12 ..3.8c
½ and 9-16 by ⅛ to 3 16 ..4.0c
½ and 9-16 by Nos. 11and 12 ..4.1c
½ inch by ⅛ and 3-16 ..4.3c
½ inch by Nos. 11 and 12 ..4.4c

Hoop Iron.
1¼ to 4, Nos. 13, 14 and 15 ..3.3c
1¼ to 2, Nos. 16, 17 and 18 ..3.4c
1¼ to 2, No. 19 ..3.5c
1¼ to 2, No. 20 ..3.6c
1¼ to 2, No. 21 ..3.7c
1¼ to 2, No. 22 ..3.8c
15-16, 1, and 1⅛, Nos. 13, 14 and 15 ..3.6c
15-16, 1, and 1⅛, Nos. 16, 17 and 18 ..3.6c
15-16, 1, and 1⅛, Nos. 19 and 20 ..3.7c
15-16, 1, and 1⅛, No. 21 ..3.8c
15-16, 1, and 1⅛, No. 22 ..3.9c
⅞, Nos. 13, 14 and 15 ..3.7c
⅞, Nos. 16, 17 and 18 ..3.8c
⅞, Nos. 19 and 20 ..3.9c
⅞, No. 21 ..4.0c
⅞, No. 22 ..4.1c
¾, Nos. 13, 14 and 15 ..4.3c
¾, Nos. 16, 17 and 18 ..4.4c
¾, Nos. 19 and 20 ..4.5c
¾, No. 21 ..4.6c
¾, No. 22 ..4.8c
11-16, Nos. 13, 14 and 15 ..4.2c
11-16, Nos. 16, 17 and 18 ..4.3c
11-16, Nos. 19 and 20 ..4.4c
11-16, No. 21 ..4.5c
11-16, No. 22 ..4.6c
⅝, Nos. 13, 14 and 15 ..4.4c
⅝, Nos. 16, 17 and 18 ..4.5c
⅝, Nos. 19 and 20 ..4.6c
⅝, No. 21 ..4.7c
⅝, No. 22 ..4.8c
⅝, No. 23 ..4.9c
9-16, Nos. 13, 14 and 15 ..4.6c
9-16, Nos. 16, 17 and 18 ..4.7c
9-16, Nos. 19 and 20 ..4.8c
9-16, No. 21 ..4.9c
9 16, No. 22 ..5.0c
9-16, No. 23 ..5.1c
½ inch, Nos. 13, 14 and 15 ..4.8c
½ " Nos. 16, 17 and 18 ..4.9c
½ " Nos. 19 and 20 ..5.1c
½ " No. 21 ..5.2c
½ " No. 22 ..5.3c
½ " No. 23 ..5.4c

The prices under Hoop Iron do not apply to Cotton Ties.

1-10c per lb. extra will be charged for each gauge lighter than the lightest indicated.

1-10c per lb. extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.
1¼ to 2 in., cut to length.
9 to 11 lbs, per set of 6 hoops ..3.5c
8 lbs. and less than 9 lbs. per set of 6 hoops ..3.6c
Less than 1bs. per set of 6 hoops ..3.8c

Extras for Cutting to Length all Preceding Iron.
All Iron, including Tire ..1.10c

Tank Iron.
No. 9 and heavier ..3.3c
Plow Slabs ..3.5c
" Wings ..3.8c

Sheet Iron.

	Common.	Charcoal.	Juniata.
No. 10 to 14	3.4c	4.0c	6.5c
No. 15 to 17	3.8c	4.3c	6.8c
No. 18 to 21	4.1c	5.0c	7.1c
No. 22 to 24	4.3c	5.8c	7.3c
No. 25 & 26	4.4c	6.0c	7.5c
No. 27	4.7c	6.2c	7.7c
No. 28	4.1c	6.6c	8.1c

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10c extra.

Wood's Patent Planished Sheet.
1st quality (A) ..10½c | 2d quality (B) ..9½c
Galvanized C. H. B.—(Charcoal Hammered Blooms.)
Nos. 14 to 20 ..12c | No. 27 ..15c
Nos. 21 to 24 ..13c | No. 28 ..16c
Nos. 25 and 26 ..14c | No. 29 ..18c
Current discount, 30 % & 35 %.

Coal Screen Iron.
1¾ by ⅝ by 5-16 ..3.0c | 1 by ⅝ by 5-16 ..3.5c

Angle Iron.
2½, 3, 3½ and 4 inch ..3.3c
1½, 1¾ 2 and 2¼ inch ..3.3c
1¼ inch ..3.4c
1 " ..3.6c
1¼ by 1 inch, for Plow Handles ..3.6c
1½ by ¾ " " " ..3.8c
1½ by ¾ " " " ..3.9c

T Rail.
8 lbs. to the yard ..3.1c | 20 lbs. to the yard ..3.0c
12 " " ..3.0c | 28 " " ..3.0c
16 " " ..3.0c | 40 " " ..3.0c

Splice Joints for 12, 16 and 20-lb. Rail, 40c each; 28 and 30 lb. Rail, 50c. each; 40 lb., 60c each.
3½ by ¾ and ½ Spikes for 20 and 28-lb. Rail ..4½c
2½ and 3 by ⅜ " " 12 and 16-lb. " ..4½c
2½ by 5 16 " " 8-lb. Rail ..5½c

Flat Rails.—Punched and Countersunk.
1½ to 2 by ½ to ⅝ inch ..3.0c
1½ by ⅜ and 7-16 inch ..3.2c
1¼ by ⅜ and ½ inch ..3.5c

Juniata Nail Rods ..6.5c
Norway " ..8.0c
Guard Iron, ¼x⅝-x⅝ and ⅝x⅝x⅝ ..4.0c
" ⅝x⅜x9-16 and ⅝x⅝x½ ..4.2c
Drag Bars ..4.3c
Dropper Bars ..4.8c
Cylinder and Landside Iron ..4.3c
Plow Beam Iron ..3.9c

Nails.
See Pittsburgh Trade Report.

Best Quality Refined Cast Steel.
Square, Flat, Octagon and Round.
⅜ to 2 inches, inclusive ..11c
5-16 and 2⅛ to 3 inches ..12c
¼ and 3¼ to 4 " ..13c
7-32 and 4⅛ to 5 " ..14c
3-16 and 5⅛ to 6 " ..17c
5-32 inch ..21c
⅛ inch ..29c
Oil Well Steel Forgings ..19½c

Machinery Steel.

	Crucible.	Bessemer & Open Hearth
Ordinary Sizes, ⅜ to 2 inch Round	6½c	5c
5-16 and 2⅛ to 3 inches	7½c	6c
¼ and 3¼ to 6 "	8½c	7c
7-32 inch	9½c	8c
3-16 "	11½c	10c

Square, Flat and Octagon, ½c extra throughout the list.
Cut to specified lengths, ½c extra.

Hammer Cast Steel.
2 inches and under ..7 c
Above 2 inches ..8 c

Sheet Steel.—Crucible.

Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth.
To 21 gauge .. 11c	9c	7½c	6c

1c. extra for each additional gauge.
Cut to multiples or specified lengths, ½c. extra.

Miscellaneous Cast Steel.
Auger and Anger Bit ..7c
Axle Steel for carriages and wagons ..7c
Frog Points and Plates ..8½c
" Side Bars ..7c
Pick, plain ..7½c
" and Mattock, beveled ..7½c
Skate Steel ..7c
Table Cutlery ..7c
Pike and Cant Hook ..7½c
Coal and Granite Wedge ..7½c
Roller ..8½c
Spindle, subject to Machinery classification ..6c
Trap Spring Steel ..7c
Forged Crank Pins and Lathe Spindles ..8c
Piston Rods, plain ..9c
" forged to shapes ..6½c
Slide Bars, plain ..9c
" forged to shapes ..6½c

Crucible, Open Hearth or Bessemer.
Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick ..9c
Boiler, Fire-Box and Flue Sheets, not less than ⅛ thick ..9½c
Circulars and semi-circulars, when ordered separately ..7c
Smoke Stack, to shape ..8c
Locomotive Tank Steel ..8c

File Cast Steel.
Square, Round, Half Round and Flat Bastard, 8-inch and over ..8c
Mill Saw, 8-inch and over ..8½c
Taper, 3½-inch and over ..9½c
Horse and Shoe Rasp ..8½c

Spring Cast Steel.
Spiral and Taper, cut to lengths ..6½c

Tire Cast Steel.
1X1¼ and over ..7½c
1X3-16, ¾X3-16 and ¼ ..8c
1 and 13-16X1½ and 5-32, ¾X3-16 and 5-32 ..8½c
⅝ and ⅝X1½ and 3-32 and 12 g ..9c
Solid Safe Cast Steel ..9c

Agricultural Implement Cast Steel.
Fork and Rake, Crucible ..7c
Horse Rake Steel, cut to lengths, Crucible ..7c
Hoe, Crucible ..7½c
Corn Stalk Cutter, beveled ..6½c
Beveled Hoe and Shovel Steel in Bars ..7½c
Crucible Plow Steel in slabs ..8c

Bessemer and Open Hearth.
Spring ..4½c
" spiral and taper, cut to lengths ..4½c
Tire, 3-16 thick and above ..5½c
Toe Calk ..4½c
Plow ..4½c
Axle Billets ..4½c
Sleigh Shoe ..4c
Cutter Shoe, cut to lengths and tapered ..4c
Scythe Back Steel ..5½c
Grain Drill Bars ..4c
" Points ..7½c
Rolling Coulter Blanks, cut and punched ..8½c
Thrasher Steel ..9½c
" Teeth ..4½c
Rolled Hammer Billets ..5½c
Terms.—Four months; 3 per cent. discount for cash, if remitted within 30 days.

Rolls and Castings.
Furnace, Floor and Straightening Plates ..2½c
Housings and Castings not otherwise specified ..3 c
Guide Plates ..3½c
Spindles and coupling boxes ..3½c
Sand Rolls and Pinions, large size ..3 c
" small size ..3 c
Pipe Mill Castings ..3½c
Rolling Mill Castings under 50 lbs ..5 c
Spur and Bevel Wheels, large ..4 c
" small ..3½c
Pulleys up to 30 inches ..4½c
" over 30 inches ..4½c
Engine Castings, light ..4½c
" heavy ..4½c
After Oct. 1, 1881, no discounts will be made at settlement as heretofore, prices quoted being net.

Chilled Rolls.
6 to 7 in. diam., 7 to 20 in. long ..5c
8 to 15 in. " 8 to 40 in. " ..5c
25 to 24 in. " 15 to 72 in. " ..4½c
14 to 31 in. " 72 to 108 in. " ..4½c

White and Red Lead.
Strictly Pure White Lead in Oil, in kegs, 7c.; in 25 ₩ Tin Pails, ½c. ₩ lb over keg price; 12½ ₩ Tin Pails, 1c ₩ lb over keg price; assorted, 1 to 5 ₩ cans, 2c. per ₩ over keg price.
Dry White Lead ..
Red Lead, very brilliant, in kegs, 7c; in barrels 6¾c
Litharge (Potter's Lead) " 7c; " 6¾c
Freights equalized with all points.
Terms: Note at sixty days, or if paid within 15 days from date of invoice, a discount of 2½ per cent. will be allowed, but not otherwise.

Window Glass.
Per Box of 50 Feet.—Discount, in small lots, 60&10 % on single strength, 60&20 % on double; in car loads, 60&10 &5 % on single strength, 70 % on double.

Single Strength.

Size.	AA.	A.	B.	C.
5 x 8 to 10 x 15	$8.25	$7.50	$7.00	$6.50
11 x 14 to 16 x 24	9.25	8.50	8.00	7.25
18x 22 to 20 x 30	10.75	9.75	8.75	7.75
15 x 36 to 24 x 30	12.25	10.75	9.00	8.50
26 x 28 to 24 x 36	13.00	11.50	9.75	9.00
26 x 36 to 26 x 44	14.50	13.25	10.75	9 50
26 x 46 to 30 x 50	15.00	14.00	11.25	10.5c
30 x 52 to 30 x 54	16.00	14 50	12.00	
30 x 56 to 34 x 56	17.25	15.50	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	
Double Strength.				
6 x 8 to 10 x 15	12.75	11.75	10.75	10.00
11 x 14 to 16 x 24	14.50	13.25	12.50	11.25
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 50	24.00	22.50	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 56 to 34 x 56	27.75	25.00	21.75	
34 x 58 to 34 x 60	29.25	27.75	24.00	
36 x 60 to 40 x 60	33.25	30.00	27.75	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 81 united inches, will be charged in the 81 united inches bracket.

BOSTON.

Reported by Macomber, Bigelow & Dowse.

Anvils.—"Eagle American" ₩ ℔ 9½c. dis 20 %

Anvil & Vise.—
No. 1, $6.25; 2, 4.25; 3, 2.50 each.....dis 20 %

Augurs & Bits.—Snell's Auger.....dis 40&10 %
L'Hommedieu's Ship Augs.....dis 15 %
Jenning's Bitts.....dis 10&10&10 %
Cook's Bitts.....dis 40&10 %
Sheparuson's Double-Cut Bitts.....dis 45 %
" " Gimlets.....dis 40 %
Btearn's Extension Hollow Augers—
No. 2, ₩ doz. $48.00, No. 3, ₩ doz. $60.00 list, dis 20 %
Bonney's Extension Hollow Augers....₩ doz $36.00
Pierce's Bitts.....dis 40 %
Griswold " .....dis 40&10 %

Axes.—Blue Jackets.....per doz 9.00
Red Cross.....per doz 8.00
" Handled.....per doz 12.00
Dowse " Boys'.....dis 33⅓ %

Ax Handles.—
Oak Extra, 31 in., No. A.....₩ doz $2.15
" 34 in., No. A.....₩ doz 2.30
" 31 in., No. B.....₩ doz 1.75
" 34 in., No. B.....₩ doz 2.00
" 31 or 34 in., No. C.....₩ doz 1.25

Axle Clips.....dis 50 %

Balances.—Chatillon's.....dis 15&10 %

Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers)....per ft. 20c
" Half-Round.....per ft, ⅝, 30; ¾, 40
Wrought " .....per ft, ½, 30; ⅝, 40; ¾, 50

Bells.—Connel's Crank Gong reduced list..dis 10&10 %

Bird Cages.
Japanned M. B. & D., reduced list, 1879.....dis 40 %
Brass " " 1879.....dis 33⅓ %

Blind Fasts.—Lock Fasts.....₩ C sets $5.00
No. 5 Fasts.....₩ C sets 4.00
Veazie Fasts.....₩ C sets 6.00
Shedd's.....₩ C sets 7.00

Blind Hinges.—Mall. Hook, 3 holes....₩ C sets 7.00

Brad Awl Handles.—
Phœnix Adjustable.....₩ doz $2.00

Belts.—Norway Iron Carriage.....dis 70&5 %
Common " .....dis 80 %

Borax.—Refined.....₩ ℔ 14c

Boring Machines.
Eagle Upright each, $5.50 list } dis40&10%
Eagle Angle each, 6.75 list }
Snell Augers.....₩ set 2.43

Braces.—Barber's.....dis 20& 5 %
Spofford's.....dis 50 & 5 %
Backus'.....dis 50 & 10 %

Bracket Saws.—Holly Scroll Saw.....each, $2.50
Demas Lathe and Scroll Saw....." 6.00
Bracket Saws, extra quality, to No. 6.....₩ gro $0.75
Steel Frame, with patterns.....₩ doz 6.00
Lester.....dis 20 %
New Rogers, all iron.....dis 25 %

Bracket Saw Blades.
Griffith's patent.....₩ gross 750

Brackets.—B. B. & B. Flower Pot reduced list—.....dis 30 &10 %
Bronzed Shelf, B. B. & B. newlist.....dis 50&10 %
Store Shelf.....dis 30&10 %

Bronze Hardware.—

Butts.—Union Fast Joint.....40& 10&10 %
" Loose " .....dis 50&10&10 %
" Japanned Acorn.....dis 60&10&10 %
" Silvered " .....dis 60&10&10 %
" Boston Finish.....dis 70&10 %
Union Spiral Spring.....dis 25&10 %
Wrought Brass.....dis 75 %

Carriage Bolts.—Eagle Norway.....dis 70& 5%
Common.....dis 80&5 %

Carriage Jacks.
"Climax" No. 1.....₩ doz $30.00
" No. 1½....." 15.00
" No. 2....." 13.40
"Universal".....dis 25 %
" No. 1.....each, $2.00
" No. 2....." 3.00
" No. 3....." 5.00
" No. 4....." 6.00
" No. 5....." 6.40

Cartridges.—U. S. Cartridge Co.....dis 70 %

Cards.—Watson's make, Horse and
" Curry.....dis 10 % } New List,
" Cotton.....dis 10 % } July 1881.
" Wool.....dis 10 % }

Casters.—Bed and Table.....dis 40 %

Chain.—Traces 6½, 10, 4, straights.....₩ pair 45c
" 6½, 10, 4, twisted.....₩ pair 50c
" 7, 12, 2, " .....₩ pair 74c
Coil 3-16.....₩ ℔ 11 c
" ¼.....₩ ℔ 8 c
" 5-16.....₩ ℔ 7 c
" ⅜.....₩ ℔ 6 c
" 7-16.....₩ ℔ 5½c
" ½.....₩ ℔ 5½c

Chalk.—White, Carpenter's.....₩ gross 90c
Red, Carpenter's.....₩ gross 80c
Blue.....₩ gross $1.00

Chisels.—Hart. Bliven & Mead, Framing.....dis 60&10&10 %
Underhill, Framing.....dis 25 %
Buck's Chisels.....dis 30

Clothes Line.—
Galvanized Wire, 100 feet each.....₩ doz $4.00

Coat Hooks.—"Dover."—Galvanized, new list..dis 60 %
Japanned, new list.....dis 60 %

Coffee Mills.—New list.....dis 33⅓ & 10 %

Copper Rivets......dis 33⅓ %

Cow Ties......dis 33 ⅓%
No. 36, 3 ft. No. 9 Wire, with toggle.....₩ doz $3.80
No. 36, 3 ft. " " with snap.....₩ doz 4.00
No. 40, 3½ ft. " " with toggle.....₩ doz 4.40
No. 45, 3½ ft. " " with snap.....₩ doz 4.40
No. 50, 4 ft. No. 4 " with toggle.....₩ doz 4.75
No. 55, 4 ft. " " with snap.....₩ doz 5.00
No. 60, 4½ ft. " " with toggle.....₩ doz 5.60
No. 65, 4½ ft. " " with snap.....₩ doz 6.20

Cocks.—Brass, L. F. & C.....dis 40 %

Cordage.—Manila, usual trade dis 10.....₩ ℔ 16
Jute.....₩ ℔ 9c

Crow-Bars.—Cast Steel.....₩ ℔ 8c
Iron Steel Pointed.....₩ ℔ 6c

Cutlery.—Pocket, American Shear Co.'s.....dis 40 %
Butcher Knives, "Woods." Lap Bolster.
Square Handle.....dis 30 %
Steak Knives.....dis 25%
Lap Bolster, Oval Handle.....dis 20 %
Sticking.....dis 30 %
Skinning.....dis 30 %
Butcher, Common Round Handle, Woods"....dis 20 %
Shoe Knives, "Woods".....dis 20 %

Dividers.—Cook's.....dis 25 %
Dog Collars.....dis 20 %
Dog Muzzles.—Automatic.....dis 15 %

Door Springs.—Torrey's Rod.....₩ doz $2.00
Imitation Torrey's Rod.....₩ doz $1.75
Gem Coil, new list.....dis 33⅓ %
Crown.....₩ doz $1.25
Warners.....₩ doz $2.00

Door Stops.—"Thurston's".....dis 40 %

Drawer Knobs.—"Thurston's".....dis 40 %

Drills.—Morse Bitt Stock.....dis 25 %
Morse Straight Shank.....dis 20 %

Emery.—Wellington Mills.....₩ ℔ 10c
Walpole Emery Mills.....₩ ℔ 6c
Turkish in 10 ℔ cans.....₩ ℔ 8c

Enamelled Ware.
Standard Mfg. Co. Kettles.....dis40 &10 %
" Sauce Pans.....dis 25 %

Felloe Plates.—Wrought.....₩ ℔

Files.
American File Co.....dis 40%
Nicholson " .....dis 40%

Fluting Machines.
Knox list, $4.00.....dis 20 %
American list, $3.40.....dis 20 %

Forks. W. C. & Co., Manure.....dis 40 %

Gimlet Bitts.
Genuine German, No. 125, 1-32 to 8-32, per doz $1.00
Pierce's.....per doz 80c

Glass Cutters.
Combination Glass Cutter and Knife Sharpener.....₩ doz $1.00

Grub Hoes.—K. P. & Co.'s No. 2, 11.50 ₩ doz.dis 35 %

Hammers.—Maydole's.....dis 15 %
Hartford Hammer Co.....dis 20 %

Hangers & Rollers.—Anti-Friction.....dis 50 %
Acme Rollers.....dis 50 %
Climax.....dis 50 %
Common Hangers.....dis 50 %
" Rollers.....dis 50 %

Hand Screws......dis 10 %

Hatchets.—C. F. Dowse new list.....dis 33⅓ %
Underhill.....dis 25 %

Hay Knives.—Lightning.....₩ doz $18.00 net
Fisher's Patent.....₩ doz @14.00

Hinges.—Strap and T (new list).....dis 45&10&10 %
Providence Plate.....₩ ℔ 4½
Wrought Screw Hook.....₩ ℔ 4 %

Hoes.—W. C. & Co.'s.....dis 4 %

Hooks and Staples.—Brewers'.....new list, dis 65 %

Horse Nails.

	No. 5	7	8	9	
National Finished	.29	.31	.30	.19	dis 20 %
Putnam Pointed	.28	.26	.24	.24	dis 10 %

Horse Nails.—Bridgewater.....dis 20 %
No. 5 28's; No. 7, 31; No. 8, 30; No. 9, 10.

Ice Cream Freezers.—Packer's, new list dis 40&10 %

Knobs.—"Norwalk." New list.....dis 15 %
Silver Glass.....dis 50&10 %
" Bell Pulls.....dis 50&10 %

Lanterns.—Guarded No. 99.....₩ doz 7.40
Tubulars, No. 0.....₩ doz 8.00
Railroad, Oil, No. 43.....₩ doz 9.00
Triangular.....₩ doz 4.00
Hurricane.....dis 20 %

Lawn Mowers.—The "Daisy."
12 in. cut.....each, $8.50
14 in. cut....." 9.00
16 in. cut....." 9.50
18 in. cut....." 10.00

Lead.—Sheet.....₩ ℔ 8c
Pipe.....₩ ℔ 7¾c

Locks.—Norwalk Genuine Bronze Goods.....dis 45 %
Eagle Cabinet.....dis 20 %
" Trunk.....dis 15 %
W. Wilcox & Co., Padlocks.....dis 40 %

Manure Forks.—W. C. & Co.....dis 50 %

Mattocks.—K. P. & Co., Long Cutter, 16.00 ₩ doz.
.....dis 35 %
K. P. & Co., Short Cutter, 16.00 ₩ doz.....dis 35 %
" Pick " 16.00 ₩ doz.....dis 35 %

Measuring Tapes.—Eddy's.....dis 20 %

Meat Cutters.—Miles' Challenge.....dis 30 %
Hale's, (New list).....dis 40 & 10 %
American.....dis 20 %

Money Drawers.—Tucker's Alarm.....₩ doz $32.40

Mouse Traps.—Delusion.....₩ doz 2.00
Novelty.....₩ doz 75

Nails......₩ keg, 3.50

Oilers.—Zinc and Tin.....dis 40 %
Brass and Copper.....dis 40 %

Ox Bows.—Extra finished and varnished.....dis 10 %
1¼ in., ₩ doz. pair..$7.00 | 2 in., ₩ doz. pair...$10.00
1¾ in., " " .. 9.00 | 2½ " " ... 12.00

Padlocks.—W. Wilcox & Co.'s.....dis 40 %

Paper.
Tarred Sheathing.....₩ ℔, 2½c
Tarred Eagle Brand.....₩ ℔, 2½c

Picks.—K. P. & Co., Adze Eye, 5 to 9 ℔ 12.00.....dis 35 %
" " " 6 to 7 ℔ 13.00.....dis 35 %

Planes.—Auburn Tool Co.,.....dis 40 %
Fancy Planes.....dis 25 %
Razee " .....dis 30 %
N. Y. Tool Co.....dis 40 %
English Iron.....dis 30%
Bailey's.....dis 20&10 %

Plated Ware.—Rogers & Bro.....dis 50&2 %

Pliers.—Vom Cleff & Co.'s.....net list
Button's Wire Pliers.....dis 33⅓ %

Plumb & Levels.—Stanley, R. & L. Co..dis 50&10 %

Pocket Knives.
American Shear Co.'s.....dis 40 %

Potato Diggers.—W. C. & Co, reduced list...dis 40 %

Pulleys.
Acme or Excelsior, 1¾ in.....per doz 120
" " 2 in....." 240
Pulley Blocks.....dis 40 %

Pumps.—Union Manufacturing Co.
Iron Cistern.....dis 40 %
" Pitcher Spout.....dis 50 %
Copper.....dis 33⅓ %

Rivets.—Black.....dis 65 %
Carriage in 10 ℔ papers.....dis 35 %
Copper.....dis 33⅓ %

Razors.—Torrey's.....dis 20 %

Razor Strops.—Torrey's.....Full line

Rules.—Stanley.....Boxwood, dis60¾ &10 %
" Ivory. dis55 &10 %

Sadirons.—Common.....₩ ℔ 3½c
Laundry.....₩ ℔ 6½c
Tailor's Geese.....₩ ℔ 6 c
Enterprise, "Potts".....dis 40

Sash Locks.—King & Hutchinson's, new list..dis 40 %

Sandpaper.—Baeder & Adamson.....dis 40 %
M. B. & D.....dis 30&5 %

Sash Weights.—Patent Eye.....₩ ℔ 1¾c

Saws.—Hand Saws, Disston's.....dis 20 %
Wheeler & Clemson.....dis 20 %

Cross-Cut Saws.
W. M. & C., Common Tooth, No. 1.....₩ foot 31c
" " Champion " .....₩ foot 31c
Disston's, Common " .....₩ foot 65c dis 40%
" Gt. American " .....₩ foot 65c dis 40%
Boynton's Lightning " .....₩ foot 44c
M. B. & D., Hand Saws.....dis 33⅓ %
W. M. & Co.'s. Circular Saws.....dis 35 %
Richardson Bros.....dis 25 %

Saw Blades.—Disston.....dis 20 %
W. M. & C.....dis 12 %
Welch & Griffith, Extra.....₩ doz $2.40
" " No. 2.....₩ doz 7.00

Scales.—Fairbanks.....dis 20 %

Screws.—Aiken's Flat-Head Iron....new list, dis 35%
American Flat-Head Iron....." dis 35%
" " Brass....." dis 30 %
" Round-Head " ....." dis 20 %
" " Iron ....." dis 30 %
Griller " Nickel-plated Common..dis 40 %

Scythes.—Clippers, in boxes.....₩ doz $9.00
Shaves.—Kimball's.....₩ inch 75c
Watrous.....dis 15 %

Shears.—American Shear Co., new list.....dis 70 %

Shot.—Tatham's.....₩ ℔ 7c

Shovels.—O. Ames, new list.....dis 15 %
O. Ames, other brands, new list.....dis 15 %
M. B. & D.....dis15 %
Oxford Birmingham Pattern.....dis 40 %

Sinks.—Mage Patent.....dis 30 %

Snow Shovels.—Malleable tips.....$1.00

Stantes.—Union.....dis 25 %
Acme.....dis 25 %
Imperial Club list No. 5, $3.75 per pair, list No. 7, 5.00 per pair.....dis 25 %

Stock and Dies.—King's.....dis 10&5 %

Tacks.—A. Field & Son's.....dis 30&10 %
Pittsfield.....dis 30&10 %
Swedes Tinned.....45&10 %
Swedes Iron.....30&10 %
Gimp and Lace.....30&10 %
Copper Tacks.....30&10 %
All balances on list.....30&10 %

Traps.—Oneida, Genuine.....dis 33⅓ %
Oneida, Imitation, H. & N.....dis 40 %
Blake's.....dis 40 & 10 %

Vises.—Simpson's Adjustable.....dis 20&5 %
Howard Vise Co.....dis 25 %
Prentiss'.....dis 20 %

Weather Strips.—Packer's.....₩ doz $4.50
Browne's Flexible Rubber.....dis 30 %
In 25 feet boxes; No. 1, ½ in. wide, ₩ yard 10c. No. 2, ¾ in., 15c. No. 3, ⅞ in., 20c.; No. 4, 1 in., 24c.
Black Walnut Spring Weather Strips....₩ doz. $3.50

Window Springs......dis 20 %
Babcock's No. 3.....₩ gross $6.00
" " 4.....₩ gross 4.50

Wire Cloth.—"Clinton".....₩ ft 3 c

Wire Fence.
Scutt's Patent, Painted.....₩ ℔ 8½c
" Galvanized.....₩ ℔ 9½c

Wire Goods.—Gate Hooks and Eyes, &c., new list.....dis 60&10 %

Wrenches.—A. G. Joe's.....dis 50 %
Girard Mfg. Co.....dis50&10 %
Girard Agl.....dis 50&10 %

Wringers.
Universal, No. 1½.....₩ doz 44.00
Novelty, No. 2.....₩ doz 44.00
Excelsior, No. A.....₩ doz 66.00
" No. B.....₩ doz 72.00
" No. CC.....₩ doz 105.00
Novelty Set Tub, 1.....₩ doz 57.00
Eureka.....₩ doz 39.00
Keystone, Wood Frame No. 1½.....₩ doz 48.00
" Iron Frame No. 2½.....₩ doz 98.00

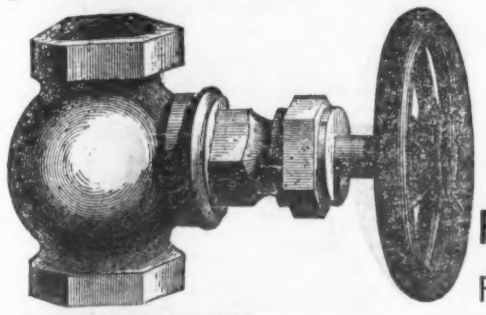
Zinc......₩ ℔ 7¼

Withington, Cooley & Co.—Hoes, Rakes, Forks &c dis 50 % Special rates for Export.

McNab & Harlin Mfg. Co.,

MANUFACTURERS OF

BRASS COCKS AND VALVES,



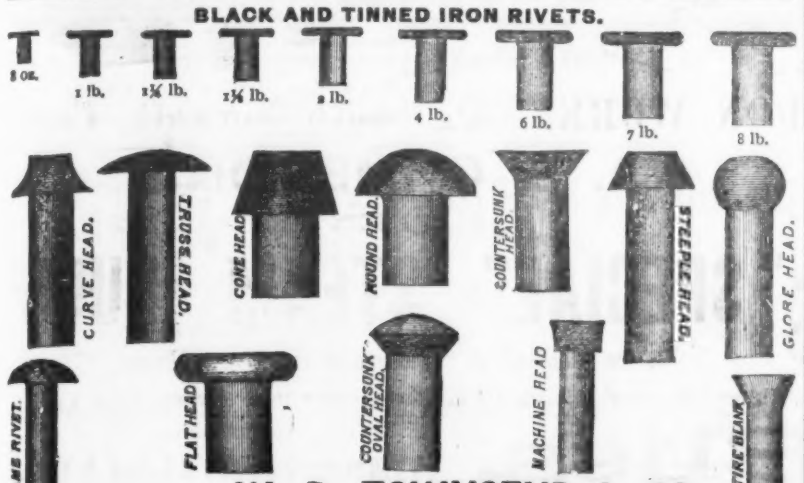
For STEAM, WATER and GAS.

WROUGHT IRON PIPE AND FITTINGS,

PLUMBERS' MATERIALS

Factory, Paterson, N. J. 56 John Street, N. Y.

BLACK AND TINNED IRON RIVETS.



W. P. TOWNSEND & CO.,

PITTSBURGH, PA.,

Manufacturers of every description of First Quality

RIVETS.

HENRY B. NEWHALL, 105 Chambers St., New York Agent.

WM. H. HASKELL & CO.,

Pawtucket, R. I.

MANUFACTURERS OF

COACH SCREWS,

(With Gimlet Points),

ALL KINDS OF

Machine and Plow Bolts,

AND

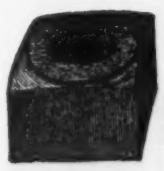
TAP BOLTS.

HENRY B. NEWHALL, 105 Chambers St., New York Agent.

STANDARD NUT CO.,

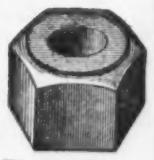
Pittsburgh, Pa.,

MANUFACTURERS OF



HOT PRESSED

Square & Hexagon Nuts,



R. R. FISH BARS,

BOLTS,

SPIKES,

RIVETS, &c.

HENRY B. NEWHALL. 105 Chambers St., New York Agent.

Philadelphia "STAR" Bolt Works.

NORWAY IRON FANCY HEAD BOLTS,

Carriage & Tire Bolts. Star Axle Clips, &c.

TOWNSEND, WILSON & HUBBARD, 2301 Cherry Street, Philadelphia, Pa

---

MACHINE, PATCH AND STAY BOLTS.

NUTS Cold Punched. WASHERS

HOOPES & TOWNSEND,

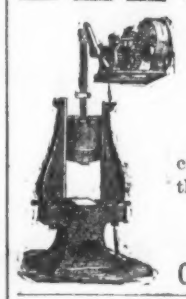
KEYSTONE BOILER RIVETS

PHILADELPHIA.

WOOD SCREWS, TANK RIVETS, FLAT LINK CHAIN.

BEECHER & PECK,

Successors to Milo Peck, Manufacturers of



PECKS DROP PRESS

PECK'S DROP LIFTER is the only one which has its parts cushioned. Being thus cushioned they are the most durable Lifter in the market.

Can be attached to any drop now in use.

Our New Illustrated Catalogue is just out.

Cor. Lloyd and River Sts., **New Haven, Conn.**

LIGHTNING HAY KNIVES.

WEYMOUTH'S PATENT.

This knife is the best in use for cutting down hay and straw in mow and stack, cutting fine feed from bale, cutting corn stalks for feed, cutting peat and ditching marshes.

The blade is best cast steel, spring temper, easily sharpened, and is giving *universal* satisfaction. A few moments' trial will show its merits, and parties once using it are unwilling to do without it. Its sales are fast increasing for exports as well as home trade, and it *seems destined* to take the place of all other Hay Knives.

They are nicely packed in boxes, one dozen each, of 50 pounds weight, suitable for shipping by land or water to any part of the world.

MANUFACTURED ONLY BY

HIRAM HOLT & CO.,

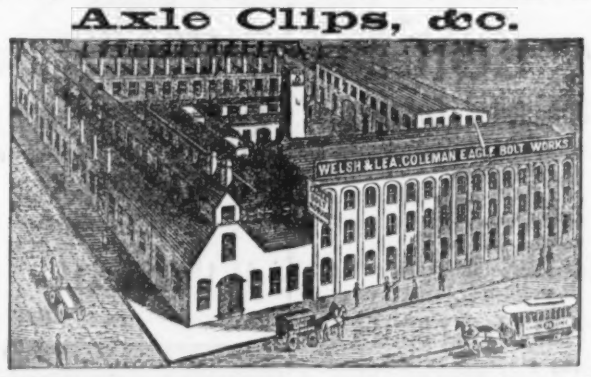
East Wilton, Franklin Co., Maine.

For sale by the Hardware Trade generally.

NORWAY IRON CARRIAGE & TIRE BOLTS,

Axle Clips, &c.

Only Medal, Phila., 1876.



Only Medal Paris, 1878.

COLEMAN EAGLE BOLT WORKS,

WELSH & LEA, Philadelphia, Pa.

F. M. HASLETT & CO.,

MANUFACTURERS OF

Carriage, Machine and Skein Bolts, Lag Screws, &c.

ALLEGHENY, PA.

W. K. ROSS, J. A. FULLER, W. K. FULLER, Sole Agents, 97 Chambers Street, New York.

Columbus Bolt Works,

COLUMBUS, OHIO.

MANUFACTURERS OF

Threshing Machine Teeth

For all the Leading Machines.

GENUINE NORWAY IRON CARRIAGE BOLTS.

Illustrated Catalogues and Prices mailed on application.

W. C. WREN'S PATENT GRATE BAR.

DAVID S. CRESWELL, Manufacturer,

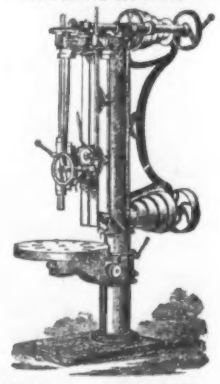
816 Race Street, - - - PHILADELPHIA, PA.

The most durable Grate Bar on the market. Send for circular and price list.

P. BLAISDELL & CO.,

WORCESTER, MASS

Manufacturers of the



"BLAISDELL" UPRIGHT DRILLS

And other First-Class Machinists' Tools.

WANTED—10,000 MECHANICS

To send Five cents each for sample of the

Metal Workers' Crayon & Mechanics' Companion

The handiest and cheapest marker for any kind of surface. Makes a white mark. Convenient and nice to work with or to carry in the pocket. Sent postpaid on receipt of 5 cents.

D. M. STEWARD, Sole Manufacturer, *231 State Avenue, Cincinnati, Ohio.*

THE "EDDY" STRAIGHTWAY

VALVES.

ALSO,

FIRE HYDRANTS.

Axe, Hatchet, Powder and Brush Machinery.

MOHAWK & HUDSON MFG. CO., WATERFORD, N. Y.

BENTON, FAULKNER & BIRD, N. Y. Agents. C. H. & W. H. MIDDLETON, Phila. Agents.

THE LOWE PATENT

FEED WATER HEATER & PURIFIER.

FOR

Heating and Purifying Water for Steam Boilers.

Patented July 12 1877.

Has Straight Tubes.

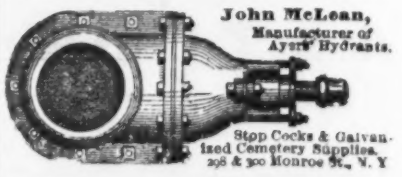
SIMPLICITY, RELIABILITY and EFFICIENCY

At Less Cost

Than any Other.

Write for prices and further information to the manufacturers,

Lowe & Watson, BRIDGEPORT, CONN.



John McLean, Manufacturer of Ayers' Hydrants.

Stop Cocks & Galvanized Cemetery Supplies. 298 & 300 Monroe St., N. Y.

HOLT PORTABLE FORGES

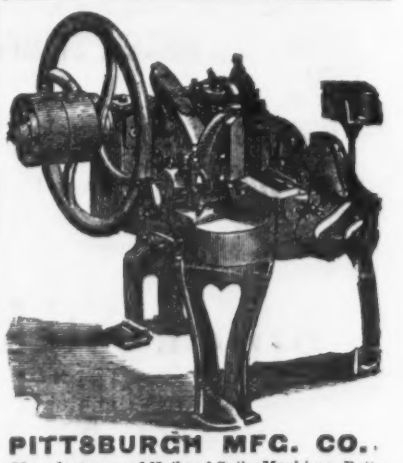
Manufactured by

HOLT MFG. CO.

Cleveland, Ohio.

New York Warerooms 79 & 81 Reade St.

F. PORTER THAYER, Manager.

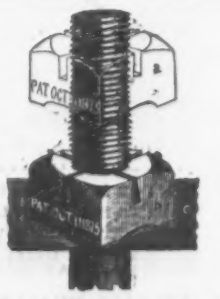


PITTSBURGH MFG. CO.

Manufacturers of Nail and Spike Machines, Bolts, Nuts, Washers, Rivets, &c. Castings, Forging and Blacksmith Work promptly attended to.

OFFICE & WORKS, Railroad St. near 28th., Pittsburgh, Pa.

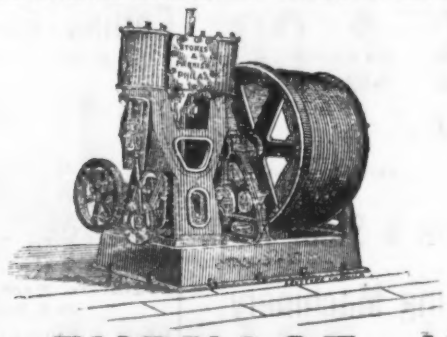
Atwood Safety Nut Co., Springfield, Mass.



J. W. LARABEE, Treasurer.

a. Atwood Nut on bolt without bearing on base—slots open. b. Atwood Nut turned to bearing c partially closing the slots and grasping the bolt.

VERTICAL ENGINE



IRON FURNACE HOIST.

The above cut represents our Vertical Iron Furnace Hoisting Engine, having double cylinders, fitted with our improved reversing valves, automatic stop and brake.
Prices furnished on application for engine alone or for complete outfit.
Patterns on hand for various sizes.

STOKES & PARRISH, 3001 Chestnut St., Philade'phia.

$ $ $ $ SAVED $ $ $ $

1977 NINETEEN HUNDRED SEVENTY-SEVEN 1977

MACHINES

BOTH NEW AND SECOND-HAND

COMPRISING
MACHINE AND BLACKSMITH
TOOLS OF EVERY DESCRIPTION.
WOOD-WORKING MACHINERY IN ALL ITS
BRANCHES. PORTABLE ENGINES. UPRIGHT and HORIZONTAL STATIONARY ENGINES, 1 TO 300 HORSE POWER. **S.C.F.&CO.** LOCOMOTIVE FIRE-BOX, HORIZONTAL, and UPRIGHT BOILERS, 1 TO 100 HORSE POWER. WATER WHEELS, COTTON AND WOOLEN MACHINERY, STEAM PUMPS, GRISTMILL MACHINERY, Etc., FULLY DESCRIBED, AND PRICES ANNEXED,

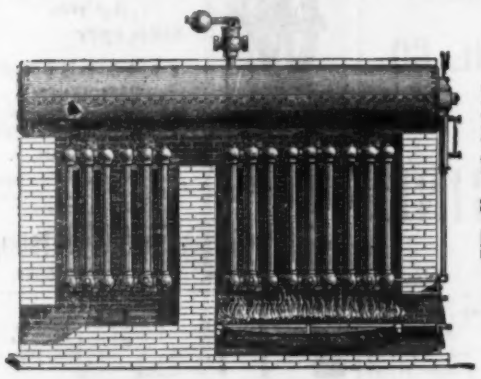
☞ Send stamp for same,] In our List No. 23. [stating what you want. ☜

We have the Largest Assortment of Machinery to be found in the hands of any firm in the country.

Works and Main Office, Manchester, N. H. **S. C. FORSAITH & CO.**

Branch Office and Wareroom, 209 Center street, New York City.

DUPLEX SAFETY BOILER.



Unequalled Economy.

Positive circulation, insuring under all circumstances a clean boiler. No sediment. The best materials. No joints, but expanded joints in combustion chamber.

The most durable boiler made. Send for circular.

DUPLEX SAFETY BOILER CO.,
34 Cortlandt Street,
NEW YORK.

Chicago Office,
45 Franklin Street.

Patent Felt and Asbestos Non-Conducting Removable Covering.

Easily Applied by Any One.

For steam boilers and pipes, hot and cold water pipes, refrigerators, meat cans, ice houses, &c.
Samples and circulars on application.

THE CHALMERS-SPENCE CO., Sole Proprietors, 10 Cortlandt St, N. Y.
Also Patent "Air Space, Non-conducting Cements, Hair Felt, the National Steel Tube Cleaner, Asbestos Materials, &c.

DAM HEINZ. GEO. J. MUNSCHAUER. MICHAEL J. STARK

NIAGARA STAMPING & TOOL CO.,

Manufacturers of

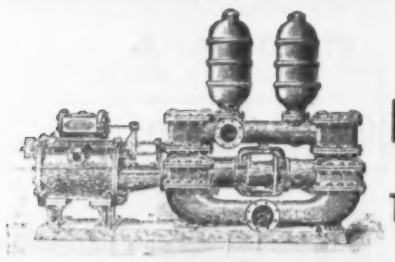
Presses, Dies and Tools

For Working Sheet Metal.

Fruit Can and Tinners' Tools, &c.

Works, 147 and 149 Elm Street,
Near Clinton st., BUFFALO, N. Y.

KEYSTONE STEAM PUMP WORKS,



PUMPS

AND

PUMPING MACHINERY

Of all Kinds.

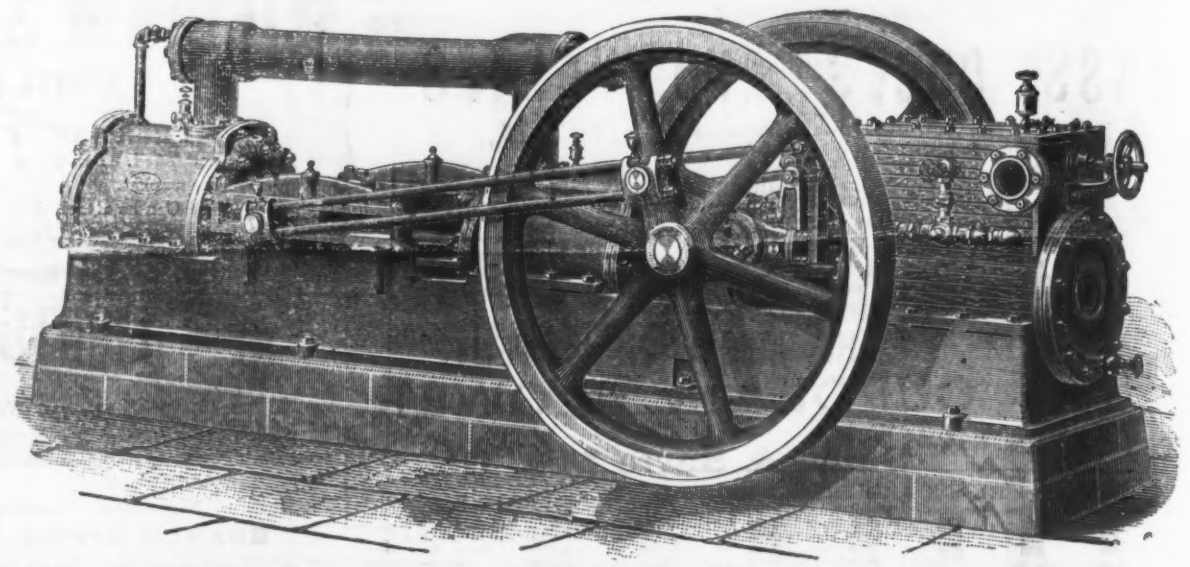
THOMPSON, EPPING & CARPENTER,
PITTSBURGH, PA.

THORNE, DeHAVEN & CO., Drilling Machines,

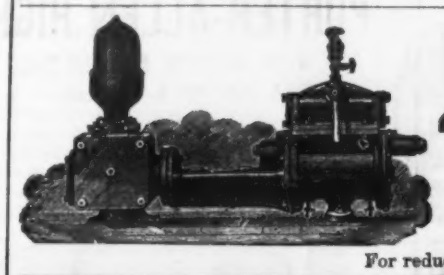
21st Street, above Market, Philadelphia.

PORTABLE DRILLS. Driven by power in any direction.
RADIAL DRILLS. Self-feed—Large Adjustable Box Table.
VERTICAL DRILLS. Self-feeding.
MULTIPLE DRILLS. 2 to 20 Spindles.
HORIZONTAL BORING AND DRILLING MACHINES.
HAND DRILLS. CAR BOX DRILLS.
SPECIAL DRILLS, For Special Work.

Air Compressors.



THE NORWALK IRON WORKS CO., South Norwalk, Conn.



A. S. CAMERON'S PATENT "SPECIAL" STEAM PUMP

Is the Standard of Excellence at Home and Abroad.

For reduced price lists address **A. S. CAMERON, East 23d Street, New York.**

E. W. Bliss,

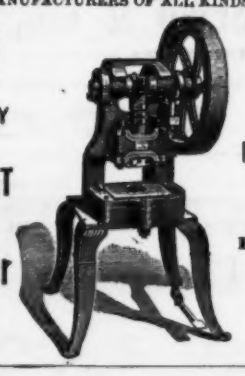
SUCCESSOR TO **BLISS & WILLIAMS,**

MANUFACTURERS OF ALL KINDS OF

PRESSES and DIES.

GOLD MEDAL AWARDED

Also Manufacturers of
SPECIAL MACHINERY
FOR
WORKING SHEET METALS, &c.
FRUIT & other CAN TOOLS.



Plymouth, Pearl and John Streets,
BROOKLYN, N. Y.,
U. S. A.

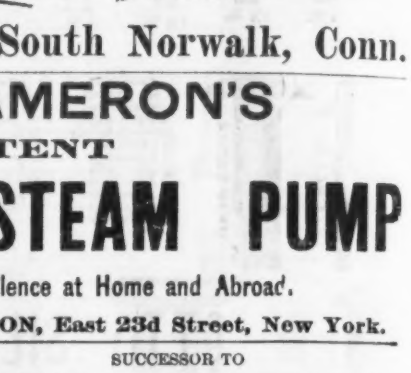
PARIS EXPOSITION. 1878.

MANNING, MAXWELL & MOORE,

Sole Sales Agents for **THE MORSE TWIST DRILL AND MACHINE CO.'S**

Manufacture of Patent Machine Relieved Nut, Hand, Blacksmith and Machine Screw Taps, Screw Plates, Tap Wrenches and Patent Relieved Pipe Taps and Pipe Reamers; also of Solid Bolt and Pipe Dies, furnished in V, U. S. Standard and Whitworth shape of threads.

111 Liberty Street, NEW YORK.



THE MEDART PATENT WROUGHT RIM PULLEY.

Forty Per Cent. Lighter and 100 Per Cent. Stronger

than any cast pulley. No shrinkage strains; perfectly balanced for high speeds; better surface for belt, and

The Cheapest Pulley in the Market.

We make these Pulleys from 10 inches to 8 feet diameter, any face, crowning or straight, split or whole, single or double arms.

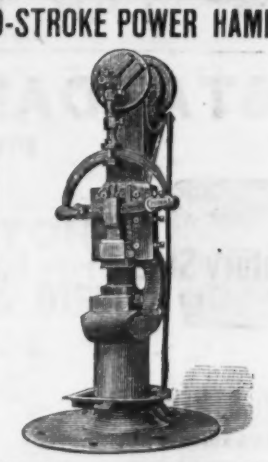
Large Pulleys a Specialty.

Send for price list.

The Hartford Engineering Co.,
HARTFORD, CONN.

Sole licensed manufacturers for the New England, Middle and Atlantic Coast States.

DEAD-STROKE POWER HAMMERS.



Prices Reduced. CONSTRUCTION IMPROVED. Seven Sizes. 5 to 250 Pounds.

The 1c and 2c pound sizes are specially adapted for Pilemakers' use, the other sizes for general forging. Send for circular and references.

DIENELT & EISENHARDT,
MAKERS.
1310 Howard St., Philadelphia.

Ludlow Valve Mfg. Co.,

OFFICE AND WORKS:
933 to 954 River St. & 67 to 83 Vail Ave., Troy, N. Y.

VALVES.

Double and Single Gate, ¾ in. to 48 in.—outside and inside Screws, Indicator, &c for Gas, Water and Steam. Send for Circular.

Also FIRE HYDRANTS.

TRADE MARK

WICKERSHAM & CO.,

MANUFACTURERS OF

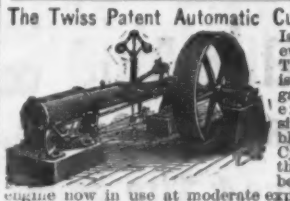
Railway, Miners', Mill & Machinists' Supplies

W. & Co.'s Packing: Steam, Hydraulic and Locomotive. Samples sent free.
Lubricants for Engines, Shafting, &c.; Rolling Mill, Railroad, Gear and Axle Grease.
Also, Star Cylinder Oils.
Samples sent free for trial upon application.

No. 309 Race Street, Philadelphia, Pa.

COCHRANE & CO., Agents, 93 Fourth Ave., Pittsburgh.

The Twiss Patent Automatic Cut-off Engine



Is first class in every respect. The valve gear is of the disengaging type, is exceedingly simple, accessible and durable. Cylinders with this cut-off can be placed on any engine now in use at moderate expense, and will save from 30 to 50 per cent. in fuel over the plain slide valve and throttle governor. Also, Vertical, and Yacht Engines. **NELSON W. TWISS,**
25 Whitney Ave., New Haven, Conn.

CRANE BROTHERS MANF'G. CO.,

CHICAGO.

MANUFACTURERS OF

WROUGHT IRON PIPE,
STEAM PUMPS,
STEAM and GAS FITTINGS.
Steam and Hydraulic

Freight and Passenger Elevators

STEAM HOISTING ENGINES
for Furnaces, Mines, &c.

Stationary Steam Engines &c

Machinery, &c.

LYON'S HAND OR POWER PUNCHES AND SHEARS,

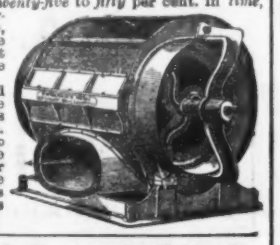
For Round, Flat or Square Iron,
ALSO,
Polishing & Buffing Machinery,
HYDRAULIC JACKS,
To raise from 2 to 120 tons.
HYDRAULIC PRESSES,
For special and general use.
HYDRAULIC HAND & POWER PUMPS
with 1 to 6 plungers, to run hydraulic presses, with either uniform or changeable speed.
Second-hand Presses.
E. LYON & CO.,
470 B Grand Street, NEW YORK.
Send for circular of what you want.

THE MACKENZIE PATENT CUPOLA & BLOWER.

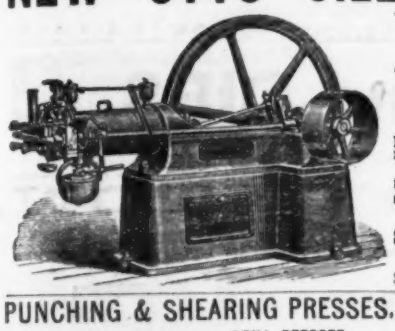
Send for circular to
Smith & Sayre Mfg. Co.,
PROPRIETORS, 245 Broadway, New York.

This Cupola has made a great revolution in melting Iron. It differs from all others in having a CONTINUOUS TUYERE, or in other words, the blast enters the fuel at all points. Above one ton capacity per hour, they are made *oval in form*. This brings the blast to the center of the furnace with the *least resistance* and *smallest* possible amount of power, and in combination with the continuous Tuyere causes complete diffusion of the air throughout the furnace, and uniform temperature, melting *ten or fifteen tons* an hour with the pressure of blast required to melt *two or three tons* in an ordinary Cupola. It also enables us to save very largely in *time* and *fuel*, the experience of our customers showing a gain of *twenty-five* to *fifty* per cent. in *time*, and *twenty-five* to *forty* per cent. *fuel* over the ordinary Cupola, and a BETTER QUALITY OF CASTING, especially in light work. This is due to the thorough diffusion of the air and more perfect combustion, extracting less carbon from the iron, making a softer and tougher casting.

We manufacture these Cupolas of any desired capacity, numbered from 1 to 20, inclusive, the numbers indicating the melting capacities in TONS PER HOUR—No. 1, one ton; No. 2, two tons; No. 3, three tons per hour, and so on up to 15, or 20 tons. We have *improved* the *construction* of these Cupolas in every way, have increased their strength and durability, and sought to make them as convenient for working and repairs as our own and the experience of our customers could suggest.



NEW OTTO SILENT GAS ENGINE.



Working Without Boiler, Steam, Coal, Ashes or Attendance.
Started Instantly by a Match, it gives Full Power Immediately.
When Stopped, all Expense Ceases.

No explosions, no fires nor cinders, no gauges, no pumps, no engineer or other attendant while running. Recommended by insurance companies.

UNSURPASSED IN EVERY RESPECT for hoisting in warehouses, printing, ventilating, running small shops, &c.

2, 4 and 7 H. P. and upwards. Built by

SCHLEICHER, SCHUMM & CO.,
Engineers and Machinists,
3045 Chestnut Street, Philadelphia.

PUNCHING & SHEARING PRESSES.

DRILL PRESSES.

Power, Foot or Hand Punches, and Shears; all sizes, from $25 to $3,000. Bar-Iron Shears, cut ¼ x 3 in.; weight, 275 lbs., $75; New Upright Power Drills, back geared, quick return motion, swing 22 in., with countershaft, weight 600 lbs., price $150. Small size, drills up to ½ in., lever feed, swing 13 in., tight and loose pulleys (no countershaft required), $25.

Peerless Punch and Shear Co.,
113 W Liberty Street,
NEW YORK CITY.

BOX'S PATENT DOUBLE SCREW HOIST.

20,000 lbs. Capacity.

A. Box & Co.
312-314 GREEN ST., Phila., Pa.

FIRST PREMIUM Everywhere.

Always RELIABLE.

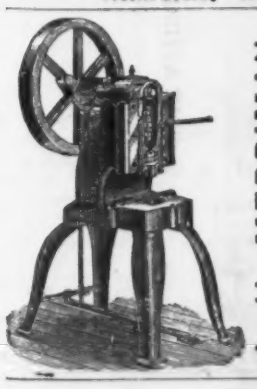
THE LA FRANCE FIRE ENGINE CO.

Manufacturers of

Rotary Steam Fire Engines
ELMIRA, N. Y.

A. H. MERRIMAN, PRESSES.

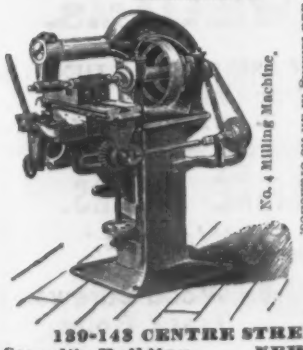
Meriden, Conn.,
Manufacturer of all Descriptions of



(Catalogue and prices sent on application.)

E. E. GARVIN & CO.,

Manufacturers of



No. 4 Milling Machine.

Milling Machines, Drill Presses,
Hand Lathes, Tapping Machines, Cutter Grinders and Wood Planers. Milling Cutters, all shapes and sizes. Gear Cutting and Milling in all its branches.

139-143 CENTRE STREET,
Cornell's Building, NEW YORK.
☞ Send for Illustrated Catalogue.

J. F. ROGERS & CO.,

107 Liberty Street, NEW YORK,
WOOD AND IRON WORKING MACHINERY.

Agents for WHITE'S CELEBRATED WOOD-WORKING MACHINERY. Molding and Planing Machines. Saw Benches, Band, Swing and Scroll Saws. Circulars and price lists furnished.

BAILEY ELEVATOR

AND PORTABLE HOIST.

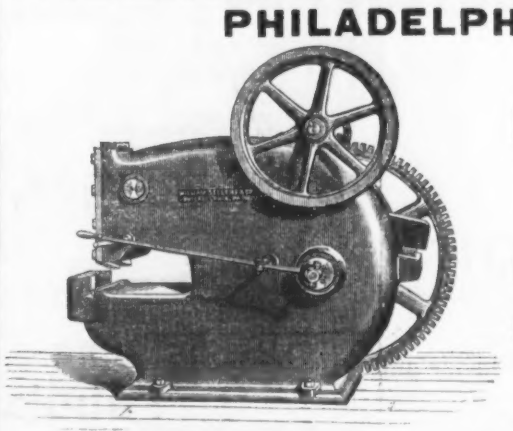
Warranted double the power and not one-half the price of other hoisters. As a proof of the above I will give them 30 days on trial. Send for catalogue and price list. Address,

J. DUNN, 32 Bank Street, CLEVELAND, OHIO.

Machinery, &c.

WILLIAM SELLERS & CO.,

PHILADELPHIA.



Shearing Machine.

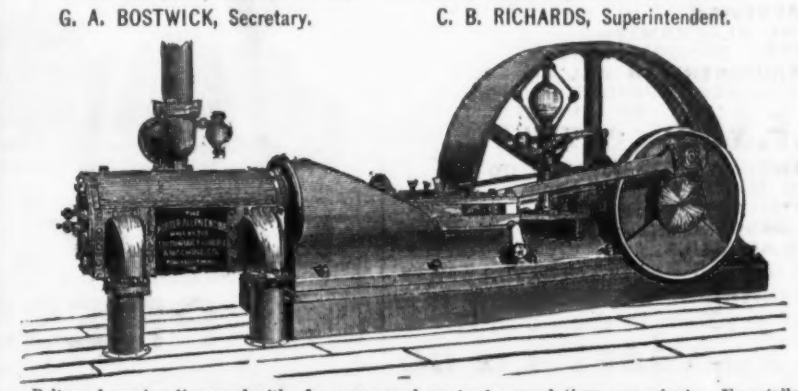
Manufacturers of

Iron & Steel Working Machinery,
MACHINISTS' TOOLS,
SHAFTING,
GEARING, &c.,
INJECTORS.

BRANCH OFFICE, 79 Liberty Street, New York.

THE PORTER-ALLEN HIGH-SPEED STEAM ENGINE

W. H. MERRICK, Pres. and Treas. C. T. PORTER, Vice-President.
G. A. BOSTWICK, Secretary. C. B. RICHARDS, Superintendent.



Belts and gearing dispensed with, for any speed up to 600 revolutions per minute. Especially adapted to Rolling Mill work, Factories and Electric Light Machines.

Having extensive foundry facilities, the company are prepared to contract for Iron and Brass Castings.

With largely increased facilities we are prepared to fill all orders for the Porter-Allen High Speed Engine on contract time. Prices and terms will be furnished on application.

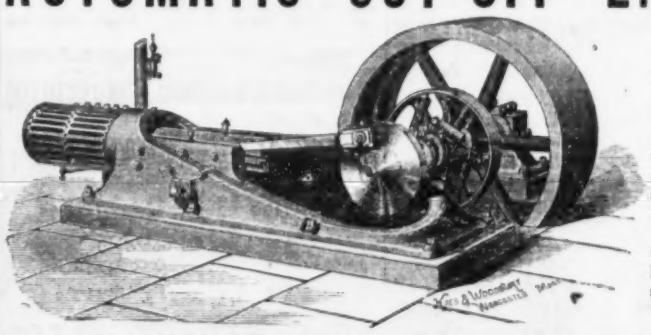
Business communications, to receive prompt attention, must be addressed to the company.

SOLE MAKERS,

THE SOUTHWARK FOUNDRY AND MACHINE CO.,

430 Washington Avenue, Philadelphia.

THE HARTFORD AUTOMATIC CUT-OFF ENGINE.



Built for **Heavy** and **Continuous Work,** and adapted to **Any Required Speed,** with **Close Regulation** and best attainable **Economy of Fuel.**

Circular and Practical Treatise on Steam Engineering sent on application.

The HARTFORD ENGINEERING COMPANY,
HARTFORD, CONN.
NEW YORK OFFICE, - - ROOMS 72 and 73, ASTOR HOUSE.

QUARTZ MILLS & MINING MACHINERY.

W. H. H. BOWERS, Mechanical Engineer, Salt Lake City, Utah.
General Western Constructing agent for
GRIFFITH & WEDGE, mfrs. of Mining and Milling Machinery, Zanesville, Ohio, and the BUCKEYE ENGINE CO., mfrs. Buckeye Engine, Salem, Ohio.
Among the many specialties handled by me is the

MINER'S PROSPECTING ENGINE.

Over fifty now in actual use; weight of boiler and engine complete only 4500 lbs.; will hoist from a vertical shaft 2500 lbs.; just the engine you want to prospect a mine 400 to 500 feet in depth.

California Combination Amalgamating Pans, Belding Settlers, Gold and Silver Mortars for both wet and dry crushing, Revolving Roasting and Chloridizing Furnaces; Revolving Dry Kilns, a new feature in mills; Buckeye Automatic Cut-off engines, Pumping Engines, Air Compressors, Rock Drills, Portable Engines and Saw Mills, Cornish Pumps, Steam Pumps, Mining Cars, Blake Crushers, Centennial Mining Cage, with safety catch attached.

I am prepared to contract for the construction of **Quartz Mills and Hoisting Works,** in any part of the Pacific Coast.

The houses I represent are the only parties having my plans of Quartz Milling and Mining Machinery, and are the only shops east of San Francisco that can build a genuine Quartz Mill, adapted to work all the various kinds of base and refractory ores.

Address all communications referring to mill and mining machinery to

W. H. H. BOWERS,
101 Main St., Salt Lake City, Utah.

BOILERS

SAFE FROM DESTRUCTIVE EXPLOSION.
25000 H.P. IN USE - SEND FOR CATALOGUE.
HARRISON BOILER WOKRS. PHILA.

Hoisting Engines & Elevators

Safe, Durable and Reasonable in price.

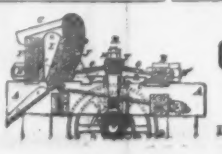
Friction Clutch Pulleys and Cut-off Couplings.

We manufacture the "Giant Friction Clutch Pulley," known as the 'Captain.' Is the **BEST IN THE WORLD** for connecting the gearing of calender rolls, hoisting coal, logs or freight. Our Clutch can connect any amount of power, at any speed, without slacking the motive power in the least, and gives no shock. It is easy to ship and unship; in fact, this is the only Clutch that can do heavy work satisfactorily.

D. FRISBIE & CO., 123 N. Fourth St., Phila., Pa.

BLAKE CRUSHER CO.,

New Haven Conn.



BLAKE'S Challenge Rock Breakers.

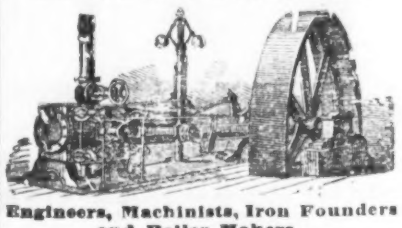
Patented Nov. 18, 1879.

See *The Iron Age* first issue of the month.

Machinery, &c.

Corliss Engine Builders,

With Wetherill's Improvements.



Engineers, Machinists, Iron Founders and Boiler Makers.

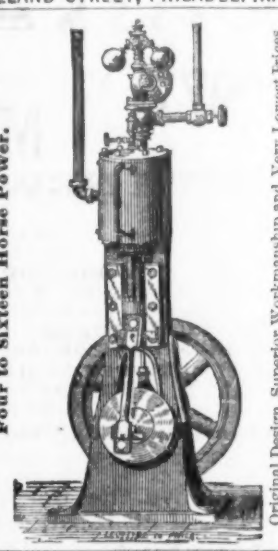
ROBT. WETHERILL & CO. Chester Pa.

CHARLES W. ERVIEN & CO.,

Engine Builders, Boiler Makers and
GENERAL MACHINISTS,
IRELAND STREET, PHILADELPHIA.

COX & SONS' NEW VERTICAL ENGINES,

Four to Sixteen Horse Power.



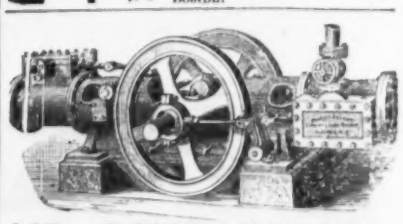
Original Design. Superior Workmanship and Very Lowest Prices. Also Built Connected on Base with Boiler. Send for illustrated Price list to

204 North Fourth St Philadelphia, Pa.

Established 1867.

Edwin Harrington & Son

MANUFACTURERS OF
PATENT EXTENSION AND SCREW CUTTING
LATHES,
Iron Planers,
Radial, Upright, Suspension, Multiple and Lever
DRILLS,
and a variety of other
MACHINISTS' TOOLS
Patent
Double Chain Screw Pulley Blocks,
unrivalled for *Durability, Safety* and *Power.*
Patent Double Chain Quick-Lift Hoists,
with Brake for quick and easy lowering.
Circulars furnished.
WORKS AND OFFICE,
Cor. N. 12th and Penna. Ave
Philadelphia, Pa., U.S.A.
Represented by J. O. MAYNARD, 97 Liberty Street, N. Y.
C. E. KIMBALL, 128 Oliver St, Boston.



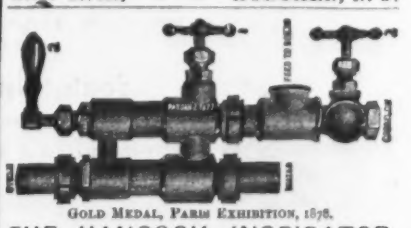
AIR COMPRESSORS.

ALLEN'S
HIGH-SPEED AIR COMPRESSORS
With Positive Moving Valves.

Allen Engines, Stationary and Marine Boilers, Hoisting Machinery. Also, Patent Evaporators and Condensers for Animal Matters.

AIR COMPRESSORS A SPECIALTY.

JOHN McLAREN,
River Street, - - HOBOKEN, N. J.



GOLD MEDAL, PARIS EXHIBITION, 1878.

THE HANCOCK INSPIRATOR,

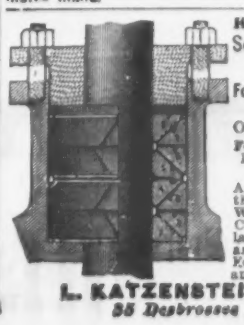
New Combined Pump and Injector.

Eclipses all other appliances hitherto introduced for feeding Steam Boilers. A Portable Boiler is not perfect without one. It lifts its water 24 feet with a low steam pressure, and puts it directly into the Boiler. No adjustment necessary for varying steam pressures.

G. W. STORER, General Agent, 120 N. 3d st., Phila.

COOKE & CO.,

(Formerly COOKE & BEGBIE,)
6 Cortlandt Street, New York,
GENERAL MACHINERY & SUPPLIES
for Machinists, Mills, Mines and Manufacturers.
Drawings and specifications furnished and estimates made.



KATZENSTEIN'S
Self-Acting Metal Packing,
For Piston Rods, Valve Stems, &c.,
Of every description.
For Steam Engines Locomotives, Pumps &c., &c.
Adopted and in use by the principal Iron Works and Steamship Companies within the last eight years in this and Foreign countries. For full particulars and references address as

L. KATZENSTEIN & CO.,
35 Desbrosses St., New York

TUBAL SMELTING WORKS.

760 South Broad Street, PHILADELPHIA.

PAUL S. REEVES,

MANUFACTURER OF

ANTI-FRICTION METALS.

CAR & MACHINERY BRASSES, INGOT BRASS AND SOLDER, WHITE BRASS.

Old Metals and Brass Turnings Wanted.

ESTABLISHED 1842.

WM. & HARVEY ROWLAND,

PHILADELPHIA,

P. O. Address: Frankford, Philad'a. } MANUFACTURERS OF ALL KINDS OF

Elliptic, Platform AND C Springs,

"Brewster Side Bar Combination Patented" Springs.

MADE EXCLUSIVELY FROM

SWEDISH STOCK, OIL-TEMPERED and WARRANTED.

Swedish Tire, Toe, Blister and Spring Steel.

CAST SPRING AND PLOW STEEL.
CAST SHOVEL, HOE AND MACHINERY STEEL.

OXFORD TOE, SLEIGH, TIRE AND SPRING STEEL.
BESSEMER SHOVEL AND PLOW STEEL.
BESSEMER MACHINERY AND CULTIVATOR STEEL.

RE-ROLLED NORWAY SHAPES.

NORWAY NAIL RODS ROLLED AND SLIT FROM SUPERIOR BRANDS.

STEEL CASTINGS

FROM 1-4 TO 10,000 LBS. WEIGHT,

True to pattern, sound and solid, superior in strength, toughness and durability to iron forgings in any position, or for any service whatever. Gearing of all kinds, Shoes, Dies, Hammerheads, Crossheads for Locomotives, etc. 15,000 Crank Shafts and 10,000 Gear wheels of this Steel now running prove its superiority over other Steel Castings. CRANK SHAFTS, CROSSHEADS AND GEARING ARE SPECIALTIES. Circulars and Price Lists free.

Address CHESTER STEEL CASTINGS CO.,

Works, Chester, Pa. 407 Library st., Philadelphia.

IMPROVED STEEL CASTINGS.

Under Hainsworth's Patents.

We make Castings practically free from blow-holes, of steel which is as soft and as easily WORKED and WELDED as Wrought Iron, yet is STIFF, STRONG and DURABLE, with a TENSILE STRENGTH of not less than 65,000 lbs. to the square inch. In short, OUR CASTINGS UNITE THE QUALITIES OF STEEL AND WROUGHT IRON.

Wheels and Pinions, Dies and Hammer Heads, Engine and Machinery Castings of all descriptions, Railroad Frogs and Crossings, Plowshares, Moldboards and Landsides.

WE USE NO CAST IRON.

Send for circular.

PITTSBURGH STEEL CASTING CO.,

PITTSBURGH, PA.

DROP HAMMERS.

PUNCHING PRESSES, DIES AND OTHER TOOLS

For the Manufacture of all Kinds of Sheet Metal Goods, Drop Forgings, &c.

STILES & PARKER PRESS CO.,

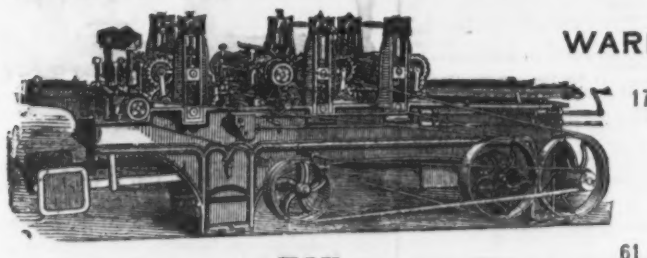
Middletown, Conn.

IRON PLANER,

36 x 36 in. x 9 ft. for sale, or will exchange for a larger size.

STILES & PARKER PRESS CO., Middletown, Conn.

Wood-Working Machinery.



WAREROOMS

172 High Street, BOSTON.

61 S. Canal Street CHICAGO.

FOR

Railroad Shops Planing Mills, Car Builders, Cabinet, Carriage, Sash, Door and Blind Makers.

We also deal in all kinds of

MACHINERY AND SUPPLIES.

S. A. WOODS MACHINE COMPANY, 91 Liberty Street, NEW YORK.

Illustrated catalogues on application.

IVES' PATENT

Burglar-Proof Door Bolts.

For sale by leading Hardware Jobber throughout the country.

HOBART B. IVES,

Sole Manufacturer and Patentee,

187 St. John Street,

NEW HAVEN, CONN., U. S. A.

Send for Illustrated Price List.

Merrill Brothers, 26 First Street, BROOKLYN, N. Y.

DROP HAMMERS, FORGINGS and POWER PRESSES.

STANLEY G. FLAGG & CO.

PHILADELPHIA, PA.

Office and Works,

N.W cor. 19th St. & Pennsylvania Ave.

Manufacturers of

STEEL CASTINGS.

A Substitute for Steel & Wrought Forgings.

☞ Circulars sent on application.

Steel Castings,

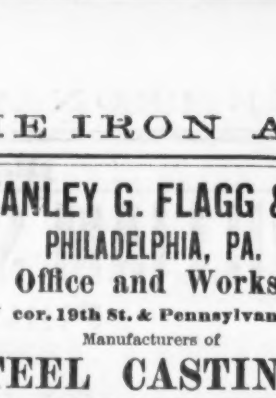
Light and heavy **Steel Castings** of superior metal, solid and homogeneous. All work guaranteed. Send for circular.

EUREKA CAST STEEL CO., Chester, Pa.

Office: 307 Walnut St., Phila.

THE GENUINE

No. 0 Tubular LANTERN,



With and without Guards,

Is Manufactured by

R. E. DIETZ,

54 & 56 Fulton St., NEW YORK.

COLUMBIA BICYCLE

The Bicycle, as a permanent, practical road vehicle, is an acknowledged fact, and the thousands in daily use are constantly increasing in numbers. It combines speed and endurance that no horse can equal, and for pleasure or health is far superior to any other out-door sport. The art of riding is easily acquired, and the exercise is recommended by the medical profession as a means of renewing health and strength, as it brings into action almost every muscle of the body. Send 3c. stamp for 24-page illustrated catalogue, containing price lists and full information.

THE POPE MFG. CO.,

597 Washington st., Boston, Mass.

New Model, Top Snap, CHAMPION

It has a **Patent Top Snap Action,** by means of which the gun can be opened by pressing the lever either to the right or left; an improvement found in no other gun. It has the **Rebounding Lock,** which ensures safety in loading beyond a doubt. The other improvements are the **Pistol Grip Stock,** and the **Patent Fore-End Fastening.** By means of the Patent Fore-End Fastening the barrels can be detached from the stock in an instant, and as quickly replaced. The shells used in this gun are the central fire, paper or brass. The brass shells can be reloaded many times. **Prices:** Plain Barrels, 16 bore, $13.00; Plain Barrels, 10 bore, $16.00; Twist Barrels, 12 bore, $18.00; Twist Barrels, 10 bore, $19.00. Address JOHN P. LOVELL & SONS, Gun Dealers, Boston, Mass.

☞ Send stamp for Illustrated Catalogue

Light Soft Gray Iron

CASTINGS

METAL PATTERN MAKING.

THE CRAIGHEAD & ELWELL MANUFACTURING CO.,

33 Barclay Street and 38 Park Place.

FACTORY, BRIDGEPORT, CONN.

THE GREATEST

ROCK BREAKER ON EARTH

And we guarantee it to do double the work of any upright convergent jaw crusher. And we challenge any manufacturer to a trial any time in Chicago. Send for Circulars.

GATES & SCOVILLE IRON WORKS,

52 Canal Street, Chicago, Ill.

TACKLE BLOCKS.

Rope and Iron Strap of all kinds. Lignumvitæ Wood for Ten-Pin Balls.

Wm. H. McMillan & Bro.,

Office, 113 South Street, New York.

Factory, 32 to 40 Penn St., Brooklyn, E. D

AIR COMPRESSORS.

PRICES REDUCED. SEND FOR NEW CATALOGUE.

CLAYTON STEAM PUMP WORKS,

14 AND 16 WATER STREET, BROOKLYN, N.Y.

Scranton Brass Works,

J. M. EVERHART,

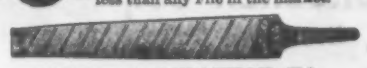
Manufacturer of

BRASS WORK,

For Water, Gas & Steam. Also

Carr & Wilcox's Patent Cut Files.

Will cut faster, wear longer, and clog less than any File in the market.



Cliff Street, SCRANTON, PA.

RUSSELL, BURDSALL & WARD,

PORTCHESTER, N. Y.,

MANUFACTURERS OF

CARRIAGE, TIRE, PLOW, STOVE & OTHER BOLTS.

Carriage Bolts made from Best Square Iron a Specialty.

JOHN RUSSELL CUTLERY CO.,

Green River Works,

MANUFACTURERS OF

Table and Pocket Cutlery,

BUTCHERS', HUNTERS', PAINTERS', DRUGGISTS' & HOUSEHOLD KNIVES

IN ALL STYLES AND VARIETIES.

OLDEST AND LARGEST AMERICAN MANUFACTURERS.

New York Office, 25 Chambers Street.

J. RUSSELL & CO. ESTABLISHED 1834. GREEN RIVER WORKS, MS.

Factories, Turners Falls, Mass.

F. W. WURSTER,

IRON FOUNDRY AND AXLE WORKS,

130 to 142 First St., Brooklyn, N. Y.

AXLES

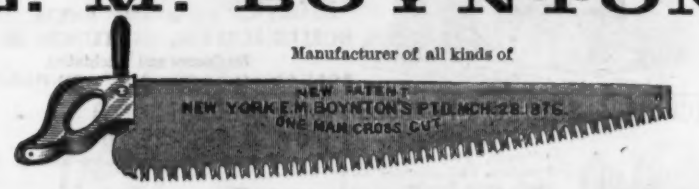
SUPERIOR WAGON, CART AND TRUCK AXLES.

Our facilities enable us to quote the trade lower prices than any other manufactory. Send for price list.

MANUFACTURER OF TAPS AND DIES.

E. M. BOYNTON,

Manufacturer of all kinds of



First-Class Saws, Frames, Cross-Cut Handles,

TOOLS, FILES, &c.

Also sole Proprietor and Manufacturer of the

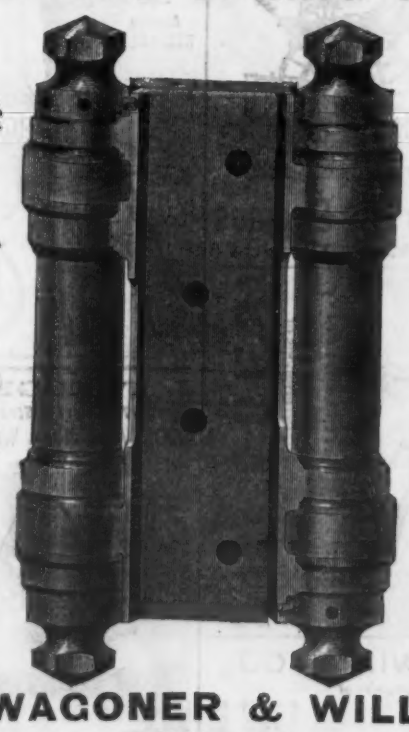
GENUINE PATENT LIGHTNING SAW

80 Beekman Street, NEW YORK.

I have during the year added to my extensive facilities the construction of a new Saw Manufactory 100 feet by 90 feet, comprising 36, 38, 40 and 42 Devoe street. I have purchased costly land and erected an additional four-story brick manufactory, in order to fill special orders for my rapidly increasing business. The new addition comprises about 30,000 feet of floor space, filled with the latest improvements in automatic machinery for saw manufacturing. For grinding circular saws I have a new machine, admitted to be unsurpassed in accuracy and speed. I have also three horizontal machines for grinding cross-cuts, mill saws, hand saws, buck-saws, &c., with capacity for over 1000 saws per day.

I have added extensive File Works, but shall make only best hand-cut Files, as in filing saws I find them the cheapest at the higher cost. I can fill special orders, and shall expect at all times to have on hand, at my store, *80 Beekman Street, New York,* a few thousand dozen each Hand Saws, Cross-cuts and Files, Saw Sets, Patent Handles, &c.

CEM SPIRAL SPRING HINGES.



SINGLE ACTING.				DOUBLE ACTING.			
Size.	For Doors.	No.	Per Pair.	Size.	For Doors.	No.	Per Pair.
3 inch.	1 to 1½ inch.	63	$0.80	3 inch.	1 to 1½ inch.	83	$1.60
4 "	1½ "	64	1.00	4 "	1½ "	84	2.00
5 "	1½ "	65	1.25	5 "	1½ "	85	2.50
6 "	1¾ "	66	1.75	6 "	1¾ "	86	3.50
7 "	1¾ "	67	2.25	7 "	1¾ "	87	4.50
8 "	2¼ "	68	3.25	8 "	2¼ "	88	6.50
10 "	2¼ "	69	4.50	10 "	2¼ "	89	9.00

SEND FOR CATALOGUE.

VAN WAGONER & WILLIAMS,

MANUFACTURERS OF

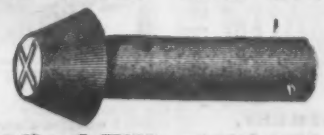
AMERICAN, GEM, ACME AND SHOW-CASE SPRING HINGES,

And a full line of ROD and COIL DOOR SPRINGS,

82 BEEKMAN STREET, - - NEW YORK.

BALTIMORE RIVET AND SPIKE WORKS.

Rivets, Spikes, Bolts, Nuts,



Washers, Bolt Ends, Wood Screws, Track Bolts.

WM. GILMOR of WM., cor. President & Fawn Sts.